

System No. PT01Document No. PE-04-0002 Rev. 0

The following table summarizes the Quality Level (QL) for each packaging component utilizing the guidelines presented in Table 5 for "Type B Fissile" from NUREG/CR-6407, *Classification of Transportation Packaging and Dry Spent Fuel Storage System Components According to Importance to Safety*. Quality Category Assessments (QCAs) follow the summary table.

NUREG/CR-6407 Definition		HalfPACT Safety Analysis Report Drawing No. 707-SAR, Rev. 6					
Function	Component Type	Item Description		Drawing Reference	QL	Ref. Doc.	QCA
Containment	Shells and Heads	ICV	Cylindrical Shells	Sheet 3, Detail S	A	N/A	01
			Upper Torispherical Head	Sheet 2; Sheet 3, Detail P	A	N/A	03
			Lower Torispherical Head	Sheet 2; Sheet 3, Detail S	A	N/A	03
			Lifting Pocket Pipes	Sheet 8, Section X-X	A	N/A	23
			Lifting Pocket Bottom Plates	Sheet 8, Section X-X	A	N/A	23
			Lifting Pocket Round Bars	Sheet 8, Section X-X	A	N/A	23
			Lifting Pocket Doubler Plates	Sheet 8, Section X-X	A	N/A	23
		OCV	Cylindrical And Conical Shells	Sheet 4, Details B & AC	A	N/A	01
			Upper Torispherical Head	Sheet 2, Detail "HalfPACT Packaging"	A	N/A	03
			Lower Torispherical Head	Sheet 2; Detail "HalfPACT Packaging"	A	N/A	03
	Vessel Closure	ICV	Upper Seal Flange	Sheet 3, Detail P; Sheet 6	A	N/A	02
			Lower Seal Flange	Sheet 3, Detail P; Sheet 6	A	N/A	02
			Locking Ring	Sheet 3, Detail P; Sheet 6	A	N/A	02
			Lock Bolt Internal Thread Inserts (optional)	Sheet 7, Section T-T	A	N/A	20
			Lock Bolt Weldments	Sheet 7, Section T-T	A	N/A	20
			Locking Ring Pins	Sheet 10, View BA-BA	A	N/A	20
			Locking Ring Stop Plates (optional)	Sheet 10, Section AZ-AZ	C	N/A	27
			Nickel Plating (optional)	Sheet 1, Flag Note 53	C	N/A	30
		OCV	Upper Seal Flange	Sheet 4, Detail AC; Sheet 6	A	N/A	02
			Lower Seal Flange	Sheet 4, Detail AC; Sheet 6	A	N/A	02
			Locking Ring	Sheet 4, Detail AC; Sheet 6	A	N/A	02
			Locking Z-Flange	Sheet 4, Detail B	A	N/A	07
			Lock Bolt Round Bars	Sheet 4, Detail Y	A	N/A	20

System No. PT01Document No. PE-04-0002Rev. 0

NUREG/CR-6407 Definition		HalfPACT Safety Analysis Report Drawing No. 707-SAR, Rev. 6					
Function	Component Type	Item Description		Drawing Reference	QL	Ref. Doc.	QCA
Containment	Vessel Closure	OCV	Lock Bolt Internal Thread Inserts	Sheet 4, Detail Y	A	N/A	20
			Lock Bolt Weldments	Sheet 7, Section T-T	A	N/A	20
			Locking Ring Pins	Sheet 10, View BC-BC	A	N/A	20
			Locking Ring Pan Head Screws	Sheet 4, Detail AC	A	N/A	20
			Locking Ring Stop Plates	Sheet 10, Section AZ-AZ	C	N/A	28
			Nickel Plating (optional)	Sheet 1, Flag Note 53	C	N/A	30
	Vent Port	ICV	Vent Port Insert	Sheet 5, Section V-V	A	N/A	21
			Outer Vent Port Plug	Sheet 5, Section V-V	A	N/A	21
		OCV	Vent Port Coupling (Inboard)	Sheet 5, Section H-H	A	N/A	21
			Vent Port Fitting	Sheet 5, Section H-H	A	N/A	21
			Vent Port Plug	Sheet 5, Section H-H	A	N/A	21
	Seals	ICV	Main O-ring Seal	Sheet 5, Section W-W	A	N/A	10
			Vent Port Plug O-ring Seal	Sheet 12, "ICV Outer Vent Port Plug"	A	N/A	10
		OCV	Main O-ring Seal	Sheet 5, Section G-G	A	N/A	10
			Vent Port Plug O-ring Seal	Sheet 11, "OCV Vent Port Plug"	A	N/A	10
Heat Transfer	Temperature Control Components	OCA	Ceramic Tape	Sheet 4, Detail Y	B	N/A	15
			Adhesive	Sheet 4, Detail Y	B	N/A	15
			Inner Thermal Shield	Sheet 4, Detail B	B	N/A	15
			Pop Rivets	Sheet 4, Detail B	B	N/A	15
			Fiberglass Insulation	Sheet 4, Detail B	B	N/A	15
			Lid Angle	Sheet 4, Detail Y	B	N/A	15
			Body Angle	Sheet 4, Detail Y	B	N/A	15
			Seal Test Port Foam or Ceramic Plug	Sheet 5, Section G-G	B	N/A	15
			Vent Port Foam or Ceramic Plug	Sheet 5, Section H-H	B	N/A	15
			Outer Thermal Shield	Sheet 4, Detail B	A	N/A	16
			Pipe Plugs	Sheet 2, View A-A, Sheet 8, Section L-L	B	N/A	17

System No. PT01Document No. PE-04-0002Rev. 0

NUREG/CR-6407 Definition		HalfPACT Safety Analysis Report Drawing No. 707-SAR, Rev. 6					
Function	Component Type	Item Description		Drawing Reference	QL	Ref. Doc.	QCA
Structural Integrity	Dunnage	ICV	Spacer Brackets	Sheet 3, Details P & S	C	N/A	08
			Spacer Facing Sheets	Sheet 3	B	N/A	09
			Spacer Honeycombs	Sheet 3	B	N/A	09
			Furane Adhesive	Sheet 3	C	N/A	30
			Pan/Round Head Screws	Sheet 3, Details P & S	C	N/A	27
			Flat Washers	Sheet 3, Details P & S	C	N/A	27
			U-Type Fasteners	Sheet 3, Details P & S	C	N/A	27
		OCV	Silicone Wear Pad	Sheet 2, Detail "HalfPACT Packaging"	C	N/A	28
			Annulus Foam Ring (optional)	Sheet 4, Detail B	C	N/A	28
	Impact Limiter	OCA	Cylindrical Shells	Sheet 2, Detail C; Sheet 3, Detail F, etc.	A	N/A	04
			Upper Torispherical Head	Sheet 2, Detail "HalfPACT Packaging"	A	N/A	05
			Lower Flat Head	Sheet 2, Detail "HalfPACT Packaging"	A	N/A	05
			Upper Z-Flange	Sheet 4, Detail B	B	N/A	06
			Lower Z-Flange	Sheet 4, Detail B	B	N/A	06
			Fire Vent Weld Flanges	Sheet 2, View A-A, Sheet 8, Section L-L	B	N/A	17
			Foam Fill Port Doubler Plates	Sheet 8, Sections K-K & L-L	B	N/A	17
			Foam Fill Port Cover Plates	Sheet 8, Sections K-K & L-L	B	N/A	17
			Ceramic Fiber Paper	Sheet 4, Details B & Z, Sheet 8, Section M-M	A	N/A	18
			Polyurethane Foam	Sheet 2, Detail "HalfPACT Packaging"	A	N/A	19
			RTV Silicone Adhesive	Sheet 1, Flag Note 34	C	N/A	30
	Packaging Hardware	OCA	Guide Plates (optional)	Sheet 4, Detail AC	C	N/A	28
			Guide Plate Pan Head Screws (optional)	Sheet 4, Detail AC	C	N/A	28
Operations Support	Security Lockwire	OCA	Tamper Indicating Seals	Sheet 4, Detail Y; Sheet 5, View AH-AH	C	N/A	29
			Tamper Indicating Tie-Wires	Sheet 4, Detail Y; Sheet 5, View AH-AH	C	N/A	29
			Hex Head Cap Screw	Sheet 5, Section H-H	C	N/A	29
	Forklift Channels	OCA	Fork Lift Pockets	Sheet 4, Detail Z	B	N/A	24

System No. PT01Document No. PE-04-0002Rev. 0

NUREG/CR-6407 Definition		HalfPACT Safety Analysis Report Drawing No. 707-SAR, Rev. 6					
Function	Component Type	Item Description		Drawing Reference	QL	Ref. Doc.	QCA
Operations Support	Forklift Channels	OCA	Cover Plates	Sheet 2, Detail E	C	N/A	29
			Round Bars	Sheet 4, Section AA-AA	C	N/A	29
			Internal Thread Inserts (optional)	Sheet 4, Section AA-AA	C	N/A	29
			Pan Head Screws and Flat Washers	Sheet 4, Section AA-AA	C	N/A	29
	Lid Lifting Hardware	OCA	Lifting Straps	Sheet 8, Section M-M	B	N/A	24
			Doubler Plates	Sheet 8, Section AX-AX	B	N/A	24
			Round Bars	Sheet 8, View AV-AV	B	N/A	24
			Round Tubing	Sheet 8, Section M-M	C	N/A	29
			Hex Head Cap Screws and Lock Washers	Sheet 8, View AV-AV	C	N/A	29
			Covers, Lanyards, and Spring Clips	Sheet 8, Section M-M	C	N/A	29
	Tie-down Components	OCA	Tie-down Lugs	Sheet 2, View A-A; Sheet 9, View J-J	B	N/A	25
			Side Doubler Plates	Sheet 9, View J-J	B	N/A	25
			Gussets	Sheet 9, View J-J & Section D-D	B	N/A	25
			Bottom Doubler Plates	Sheet 9, Section D-D	B	N/A	25
			Bottom Tripler Plates	Sheet 9, Section BD-BD	B	N/A	25
	Vent and Seal Test Port Plugs and Covers	ICV	Inner Vent Port Plug	Sheet 5, Section V-V	C	N/A	13
			Vent Port Cover	Sheet 5, Section V-V	C	N/A	13
			Wiper O-ring Seal Holder	Sheet 5, Section V-V	C	N/A	13
			Pan/Round Head Drive Screws	Sheet 5, Section V-V	C	N/A	13
			Debris Shield	Sheet 5, Section W-W	C	N/A	13
			Debris Shield Adhesive Tape	Sheet 5, Section W-W	C	N/A	13
			Vent Port Mesh (optional)	Sheet 5, Section V-V	C	N/A	13
			Seal Test Port Insert	Sheet 5, Section W-W	B	N/A	22
			Seal Test Port Plug	Sheet 5, Section W-W	B	N/A	22
		OCV	Seal Test Port Access Plug	Sheet 5, Section G-G	B	N/A	12
			Seal Test Port Coupling	Sheet 5, Section G-G	B	N/A	12

System No. PT01Document No. PE-04-0002Rev. 0

NUREG/CR-6407 Definition		HalfPACT Safety Analysis Report Drawing No. 707-SAR, Rev. 6					
Function	Component Type	Item Description		Drawing Reference	QL	Ref. Doc.	QCA
Operations Support	Vent and Seal Test Port Plugs and Covers	OCV	Vent Port Access Plug	Sheet 5, Section H-H	B	N/A	12
			Vent Port Coupling (Outboard)	Sheet 5, Section H-H	B	N/A	12
			Vent Port Plug Handling O-ring Seal	Sheet 11, Detail "OCV Vent Port Plug"	C	N/A	14
			Vent Port Cover	Sheet 11, Detail "OCV Vent Port Cover"	C	N/A	14
			Vent Port Cover Handling O-ring Seal	Sheet 11, Detail "OCV Vent Port Cover"	C	N/A	14
			Seal Test Port Insert	Sheet 5, Section G-G	B	N/A	22
			Seal Test Port Plug	Sheet 5, Section G-G	B	N/A	22
		OCA	Seal Test Port Doubler Plate	Sheet 5, Section G-G	B	N/A	12
			Seal Test Port Fiberglass Tube	Sheet 5, Section G-G	C	N/A	14
			Seal Test Port Tubing	Sheet 5, Section G-G	C	N/A	14
			Vent Port Doubler Plate	Sheet 5, Section H-H	B	N/A	12
			Vent Port Fiberglass Tube	Sheet 5, Section H-H	C	N/A	14
			Epoxy Adhesive	Sheet 1, Flag Note 32	C	N/A	30
			RTV Silicone Adhesive	Sheet 1, Flag Note 34	C	N/A	30
	Outer Seals	ICV	Test O-ring Seal	Sheet 5, Section W-W	C	N/A	11
			Inner Vent Port Plug O-ring Seal	Sheet 12, Detail "ICV Inner Vent Port Plug"	C	N/A	13
			Vent Port Cover O-ring Seal	Sheet 12, Detail "ICV Vent Port Cover"	C	N/A	13
			Wiper O-ring Seal	Sheet 5, Section V-V	C	N/A	13
			Seal Test Port Plug O-ring Seal	Sheet 11, Detail "OCV & ICV Seal Test Port Plug"	B	N/A	22
		OCV	Test O-ring Seal	Sheet 5, Section G-G	C	N/A	11
			Vent Port Cover O-ring Seal	Sheet 11, Detail "OCV Vent Port Cover"	C	N/A	14
			Seal Test Port Plug O-ring Seal	Sheet 11, Detail "OCV & ICV Seal Test Port Plug"	B	N/A	22
Miscellaneous	Miscellaneous	OCA	Paint (optional)	Sheet 1, Flag Note 25	C	N/A	28
			Nameplates	Sheet 2, View "A-A"	C	N/A	28
			Labels	Sheet 2, Detail "HalfPACT Packaging"	C	N/A	28
			Shipping Label Holder (optional)	Sheet 2, Detail "HalfPACT Packaging"	C	N/A	28

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NUREG/CR-6407 Definition		HalfPACT Safety Analysis Report Drawing No. 707-SAR, Rev. 6					
Function	Component Type	Item Description		Drawing Reference	QL	Ref. Doc.	QCA
Miscellaneous	Miscellaneous	All	Weld Filler Material	Most drawing sheets	A	N/A	26
			Vacuum Grease	Sheet 1, Flag Notes 15 & 38	C	N/A	30
			Optional Stainless Steel Compatible Lube	Sheet 3, Detail P; Sheet 4, Detail AC	C	N/A	30
			Nickel Bearing Lubricant	Sheet 1, Flag Note 16	C	N/A	30
			Thread Locking Compound	Sheet 1, Flag Note 17	C	N/A	30
			Labeling	Sheet 1, Flag Notes 29, 30, & 40	C	N/A	30

System No. PT01 Document No. PE-04-0002 Rev. 0
Subject HalfPACT Package QCA No. 01 Rev. 0
Drawing No. PacTec Drawing No. 707-SAR (HalfPACT Safety Analysis Report Drawing) Rev. 6

ITEM DESCRIPTION:

ICV AND OCV CYLINDRICAL AND CONICAL SHELLS

1. **ICV:** Sheet 1, G/N 6, Zone C/D-6/7/8; Sheet 1, G/N 7, Zone C-6/7/8; Sheet 1, G/N 8, Zone C-6/7/8; Sheet 1, F/N 19, Zone A/B-6/7/8; Sheet 1, G/N 24, Zone A-6/7/8; Sheet 1, G/N 26, Zone D-4/5/6; Sheet 1, G/N 27, Zone D-4/5/6; Sheet 1, G/N 47, Zone A-4/5/6; Sheet 1, G/N 50, Zone C-1/2/3; Sheet 3, Detail S, Zone B/C-2
2. **OCV:** Sheet 1, G/N 6, Zone C/D-6/7/8; Sheet 1, G/N 7, Zone C-6/7/8; Sheet 1, G/N 8, Zone C-6/7/8; Sheet 1, F/N 19, Zone A/B-6/7/8; Sheet 1, G/N 24, Zone A-6/7/8; Sheet 1, G/N 26, Zone D-4/5/6; Sheet 1, G/N 27, Zone D-4/5/6; Sheet 1, G/N 47, Zone A-4/5/6; Sheet 1, G/N 50, Zone C-1/2/3; Sheet 4, Detail B, Zone B-5; Sheet 4, Detail B, Zone C-5; Sheet 4, Detail AC, Zone D-2

QUALITY CATEGORY: ☒ Category A ☐ Category B ☐ Category C

Basis:

The cylindrical and conical shells are a primary part of the inner and outer containment vessel (ICV and OCV), and are required to maintain containment under normal conditions of transport and hypothetical accident conditions. A single failure could release radioactive material from the packaging.

Critical Characteristics: ☒ CMTR (chemicals and physicals) ☒ Other (state below):

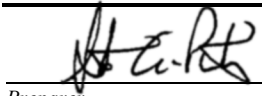
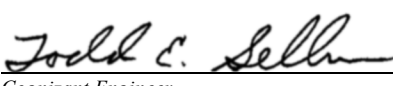
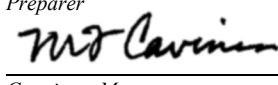

Stainless steel material per ASTM A240, Type 304. The minimum thickness for all 3/16-inch nominal thickness material is 0.178-inch, and the minimum thickness for all 1/4-inch nominal thickness material is 0.240-inch. The maximum thickness for all material is in accordance with Table A1.17 of ASTM A480-95a or A2.17 of ASTM A480-99b.

Fabricate cylindrical and conical shells in accordance with the tolerance requirements of Section III, Division 1, Subsection NE, Article NE-4220, of the ASME Boiler and Pressure Vessel Code (1995 Edition, 1997 Addenda, or later).

All construction welding of the shells shall be full penetration (V-groove if longitudinal), and weld procedures and welding personnel shall be qualified in accordance with Section IX of the ASME Boiler and Pressure Vessel Code (1995 Edition, 1997 Addenda, or later). Visually examine welds in accordance with AWS D1.1, liquid penetrant inspect on the final pass in accordance with Section III, Division 1, Subsection NB, Article NB-5000, and Section V, Article 6, of the ASME Boiler and Pressure Vessel Code (1995 Edition, 1997 Addenda, or later), and radiograph test inspected in accordance with Section III, Division 1, Subsection NB, Article NB-5000, and Section V, Article 2, of the ASME Boiler and Pressure Vessel Code (1995 Edition, 1997 Addenda, or later). Welds shall conform to Section III, Division 1, Subsection NB, Article NB-4400, of the ASME Boiler and Pressure Vessel Code (1995 Edition, 1997 Addenda, or later), and shall have a maximum reinforcement of 3/32-inch.

COMMERCIAL GRADE DEDICATION: (SUMMARIZE CHARACTERISTICS)

N/A

 Preparer	<u>11.19.04</u> Date	 Cognizant Engineer	<u>11/23/04</u> Date
 Cognizant Manager	<u>11.23.04</u> Date	 QA Representative	<u>12-7-04</u> Date

System No. PT01 Document No. PE-04-0002 Rev. 0
Subject HalfPACT Package QCA No. 02 Rev. 0
Drawing No. PacTec Drawing No. 707-SAR (HalfPACT Safety Analysis Report Drawing) Rev. 6

ITEM DESCRIPTION:

ICV AND OCV SEAL FLANGES AND LOCKING RINGS

1. **ICV:** Sheet 1, G/N 6, Zone C/D-6/7/8; Sheet 1, G/N 7, Zone C-6/7/8; Sheet 1, G/N 8, Zone C-6/7/8; Sheet 1, F/N 11, Zone B/C-6/7/8; Sheet 3, Detail P, Zone B-4/5; Sheet 6, Detail "ICV UPPER, SEAL FLANGE", Zone A/B-7; Sheet 6, Detail "ICV LOWER SEAL FLANGE", Zone A/B-5; Sheet 6, Detail "ICV LOCKING RING", Zone A/B-3/4
2. **OCV:** Sheet 1, G/N 6, Zone C/D-6/7/8; Sheet 1, G/N 7, Zone C-6/7/8; Sheet 1, G/N 8, Zone C-6/7/8; Sheet 1, F/N 11, Zone B/C-6/7/8; Sheet 4, Detail AC, Zone C-2; Sheet 6, Detail "OCV UPPER SEAL FLANGE", Zone C/D-7; Sheet 6, Detail "OCV LOWER SEAL FLANGE", Zone C/D-5; Sheet 6, Detail "OCV LOCKING RING", Zone C/D-3/4

QUALITY CATEGORY: ☒ Category A ☐ Category B ☐ Category C

Basis:

The seal flanges and locking rings are a primary part of the inner and outer containment vessel (ICV and OCV), and are required to maintain positive closure and containment under normal conditions of transport and hypothetical accident conditions. A single failure could release radioactive material from the packaging.

Critical Characteristics: ☒ CMTR (chemicals and physicals) ☒ Other (state below):



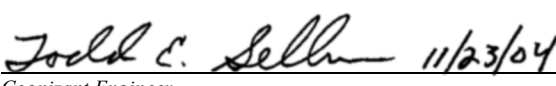
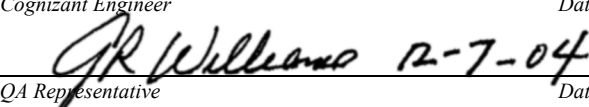
Stainless steel material per ASTM A240, Type 304 (rolled and full penetration welded plate), or ASTM A182, Grade F304 (forged billet), or ASTM A351, Grade CF8A (centrifugal casting).

When using rolled and welded plate for the seal flanges and/or locking rings, all welding shall be full penetration, and weld procedures and welding personnel shall be qualified in accordance with Section IX of the ASME Boiler and Pressure Vessel Code (1995 Edition, 1997 Addenda, or later). Visually examine welds in accordance with AWS D1.1, liquid penetrant inspect on the final pass in accordance with Section III, Division 1, Subsection NB, Article NB-5000, and Section V, Article 6, of the ASME Boiler and Pressure Vessel Code (1995 Edition, 1997 Addenda, or later), and radiograph test inspect in accordance with Section III, Division 1, Subsection NB, Article NB-5000, and Section V, Article 2, of the ASME Boiler and Pressure Vessel Code (1995 Edition, 1997 Addenda, or later).

Forged billets and centrifugal castings shall be radiograph or ultrasonic test inspected in accordance with Section III, Division 1, Subsection NB, Article NB-2500, and Section V, Article 2 or Article 5, respectively, of the ASME Boiler and Pressure Vessel Code (1995 Edition, 1997 Addenda, or later).

COMMERCIAL GRADE DEDICATION: (SUMMARIZE CHARACTERISTICS)

N/A

 11.19.04
Preparer Date
 11.23.04
Cognizant Manager Date
 11/23/04
Cognizant Engineer Date
 12-7-04
QA Representative Date

System No. PT01 Document No. PE-04-0002 Rev. 0
Subject HalfPACT Package QCA No. 03 Rev. 0
Drawing No. PacTec Drawing No. 707-SAR (HalfPACT Safety Analysis Report Drawing) Rev. 6

ITEM DESCRIPTION:

ICV AND OCV ASME TORISPHERICAL HEADS

1. **ICV Upper and Lower Heads:** Sheet 1, G/N 6, Zone C/D-6/7/8; Sheet 1, G/N 7, Zone C-6/7/8; Sheet 1, G/N 8, Zone C-6/7/8; Sheet 1, F/N 19, Zone A/B-6/7/8; Sheet 1, G/N 47, Zone A-4/5/6; Sheet 1, G/N 50, Zone C-1/2/3; Sheet 2, "ASME TORISPHERICAL AND FLAT HEADS", Zone A/B-4/5/6
2. **OCV Upper and Lower Heads:** Sheet 1, G/N 6, Zone C/D-6/7/8; Sheet 1, G/N 7, Zone C-6/7/8; Sheet 1, G/N 8, Zone C-6/7/8; Sheet 1, F/N 19, Zone A/B-6/7/8; Sheet 1, G/N 47, Zone A-4/5/6; Sheet 1, G/N 50, Zone C-1/2/3; Sheet 2, "ASME TORISPHERICAL AND FLAT HEADS", Zone A/B-4/5/6

QUALITY CATEGORY: ☒ Category A ☐ Category B ☐ Category C

Basis:

The ASME torispherical heads are a primary part of the inner and outer containment vessel (ICV and OCV), and are required to maintain containment under normal conditions of transport and hypothetical accident conditions. A single failure could release radioactive material from the packaging.

Critical Characteristics: ☒ CMTR (chemicals and physicals) ☒ Other (state below):

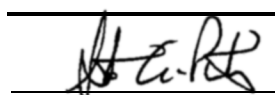
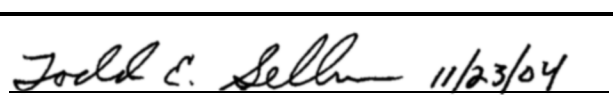

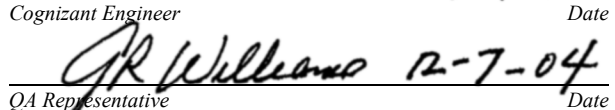
Stainless steel material per ASTM A240, Type 304. The thickness of as-rolled material used for heads may be greater than the maximum thickness allowed for 1/4-inch nominal thickness material per Table A1.17 of ASTM A480-95a or A2.17 of ASTM A480-99b to allow for thinning during the forming process. The minimum thickness for all 1/4-inch nominal thickness material is 0.240-inch after forming.

Fabricate heads in accordance with Section VIII of the ASME Boiler and Pressure Vessel Code (1995 Edition, 1997 Addenda, or later).

All construction welding of the ASME torispherical heads shall be full penetration, and weld procedures and welding personnel shall be qualified in accordance with Section IX of the ASME Boiler and Pressure Vessel Code (1995 Edition, 1997 Addenda, or later). Visually examine welds in accordance with AWS D1.1, liquid penetrant inspect on the final pass in accordance with Section III, Division 1, Subsection NB, Article NB-5000, and Section V, Article 6, of the ASME Boiler and Pressure Vessel Code (1995 Edition, 1997 Addenda, or later), and radiograph test inspect in accordance with Section III, Division 1, Subsection NB, Article NB-5000, and Section V, Article 2, of the ASME Boiler and Pressure Vessel Code (1995 Edition, 1997 Addenda, or later). Welds shall have a maximum reinforcement of 3/32-inch.

COMMERCIAL GRADE DEDICATION: (SUMMARIZE CHARACTERISTICS)

N/A

 Preparer	<u>11.19.04</u> Date	 Cognizant Engineer	<u>11/23/04</u> Date
 Cognizant Manager	<u>11.23.04</u> Date	 QA Representative	<u>12-7-04</u> Date

System No. PT01 Document No. PE-04-0002 Rev. 0
Subject HalfPACT Package QCA No. 04 Rev. 0
Drawing No. PacTec Drawing No. 707-SAR (HalfPACT Safety Analysis Report Drawing) Rev. 6

ITEM DESCRIPTION:

OCA CYLINDRICAL SHELLS

Sheet 1, G/N 6, Zone C/D-6/7/8; Sheet 1, G/N 7, Zone C-6/7/8; Sheet 1, G/N 8, Zone C-6/7/8; Sheet 1, F/N 19, Zone A/B-6/7/8; Sheet 1, G/N 24, Zone A-6/7/8; Sheet 1, G/N 26, Zone D-4/5/6; Sheet 1, G/N 27, Zone D-4/5/6; Sheet 1, G/N 47, Zone A-4/5/6; Sheet 1, G/N 50, Zone C-1/2/3; Sheet 2, Detail "HalfPACT PACKAGING", Zone C/D-5; Sheet 2, Detail C, Zone B-1/2; Sheet 3, Detail F, Zone B-4; Sheet 4, Detail B, Zone A/B-3/4; Sheet 4, Detail B, Zone D-3/4; Sheet 4, Detail Y, Zone A-6/7

QUALITY CATEGORY: ☒ Category A ☐ Category B ☐ Category C

Basis:

The outer cylindrical shells comprise an important portion of the outer containment assembly (OCA) "impact limiter", and are required to structurally and thermally protect containment under normal conditions of transport and hypothetical accident conditions. Failure of the shells could reduce the structural and/or thermal effectiveness of the underlying polyurethane foam and thus the effectiveness of the containment seals, resulting in a release radioactive material from the packaging.

Critical Characteristics: ☒ CMTR (chemicals and physicals) ☒ Other (state below):

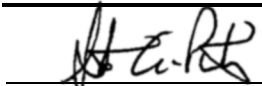
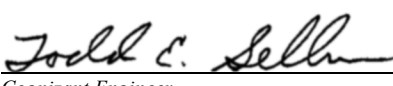


Stainless steel material per ASTM A240, Type 304. The minimum thickness for all 1/4-inch nominal thickness material is 0.240-inch, and the minimum thickness for all 3/8-inch nominal thickness material is 0.365-inch. The maximum thickness for all material is in accordance with Table A1.17 of ASTM A480-95a or A2.17 of ASTM A480-99b.

Fabricate cylindrical shells in accordance with the tolerance requirements of Section III, Division 1, Subsection NE, Article NE-4220, of the ASME Boiler and Pressure Vessel Code (1995 Edition, 1997 Addenda, or later).

All construction welding of the shells shall be full penetration (V-groove if longitudinal), and weld procedures and welding personnel shall be qualified in accordance with Section IX of the ASME Boiler and Pressure Vessel Code (1995 Edition, 1997 Addenda, or later). Visually examine welds in accordance with AWS D1.1 and liquid penetrant inspect on the final pass in accordance with Section III, Division 1, Subsection NF, Article NF-5000 of the ASME Boiler and Pressure Vessel Code (1995 Edition, 1997 Addenda, or later), and liquid penetrant inspect on the root and final pass in accordance with Section III, Division 1, Subsection NB, Article NB-5000, and Section V, Article 6, of the ASME Boiler and Pressure Vessel Code (1995 Edition, 1997 Addenda, or later), or radiograph test inspected in accordance with Section III, Division 1, Subsection NB, Article NB-5000, and Section V, Article 2, of the ASME Boiler and Pressure Vessel Code (1995 Edition, 1997 Addenda, or later). Welds shall conform to Section III, Division 1, Subsection NF, Article NF-4400, of the ASME Boiler and Pressure Vessel Code (1995 Edition, 1997 Addenda, or later), and shall have a maximum reinforcement of 3/32-inch.

COMMERCIAL GRADE DEDICATION: (SUMMARIZE CHARACTERISTICS)

N/A

 Preparer	<u>11.19.04</u> Date	 Cognizant Engineer	<u>11/23/04</u> Date
 Cognizant Manager	<u>11.23.04</u> Date	 QA Representative	<u>12-7-04</u> Date

System No. PT01 Document No. PE-04-0002 Rev. 0
Subject HalfPACT Package QCA No. 05 Rev. 0
Drawing No. PacTec Drawing No. 707-SAR (HalfPACT Safety Analysis Report Drawing) Rev. 6

ITEM DESCRIPTION:

OCA ASME TORISPHERICAL AND FLAT HEADS

Sheet 2, "ASME TORISPHERICAL AND FLAT HEADS", Zone A/B-4/5/6

QUALITY CATEGORY: ☒ Category A ☐ Category B ☐ Category C

Basis:

The ASME torispherical and flat heads comprise an important portion of the outer containment assembly (OCA) "impact limiter", and are required to structurally and thermally protect containment under normal conditions of transport and hypothetical accident conditions. Failure of the heads could reduce the structural and/or thermal effectiveness of the underlying polyurethane foam and thus the effectiveness of the containment seals, resulting in a release of radioactive material from the packaging.

Critical Characteristics: ☒ CMTR (chemicals and physicals) ☒ Other (state below):

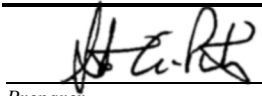
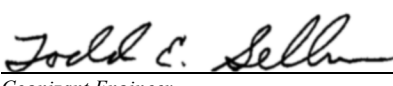
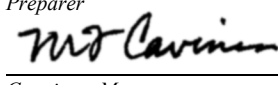

Stainless steel material per ASTM A240, Type 304. The thickness of as-rolled material used for heads may be greater than the maximum thickness allowed for 1/4-inch nominal thickness material per Table A1.17 of ASTM A480-95a or A2.17 of ASTM A480-99b to allow for thinning during the forming process. The minimum thickness for all 1/4-inch nominal thickness material is 0.240-inch after forming.

Fabricate heads in accordance with Section VIII of the ASME Boiler and Pressure Vessel Code (1995 Edition, 1997 Addenda, or later).

All construction welding of the ASME torispherical heads shall be full penetration, and weld procedures and welding personnel shall be qualified in accordance with Section IX of the ASME Boiler and Pressure Vessel Code (1995 Edition, 1997 Addenda, or later). Visually examine welds in accordance with AWS D1.1, liquid penetrant inspect on the final pass in accordance with Section III, Division 1, Subsection NB, Article NB-5000, and Section V, Article 6, of the ASME Boiler and Pressure Vessel Code (1995 Edition, 1997 Addenda, or later), and radiograph test inspect in accordance with Section III, Division 1, Subsection NB, Article NB-5000, and Section V, Article 2, of the ASME Boiler and Pressure Vessel Code (1995 Edition, 1997 Addenda, or later). Welds shall have a maximum reinforcement of 3/32-inch.

COMMERCIAL GRADE DEDICATION: (SUMMARIZE CHARACTERISTICS)

N/A

 Preparer	<u>11.19.04</u> Date	 Cognizant Engineer	<u>11/23/04</u> Date
 Cognizant Manager	<u>11.23.04</u> Date	 QA Representative	<u>12-7-04</u> Date

System No. PT01 Document No. PE-04-0002 Rev. 0
Subject HalfPACT Package QCA No. 06 Rev. 0
Drawing No. PacTec Drawing No. 707-SAR (HalfPACT Safety Analysis Report Drawing) Rev. 6

ITEM DESCRIPTION:

OCA UPPER AND LOWER Z-FLANGES

Sheet 1, G/N 6, Zone C/D-6/7/8; Sheet 1, G/N 7, Zone C-6/7/8; Sheet 1, G/N 8, Zone C-6/7/8; Sheet 1, F/N 28, Zone C-4/5/6; Sheet 4, Detail B, Zone C-3/4

QUALITY CATEGORY: ☐ Category A ☒ Category B ☐ Category C

Basis:

The OCA upper and lower Z-flanges comprise a portion of the outer containment assembly (OCA) "impact limiter", and are required to structurally and thermally protect containment under normal conditions of transport and hypothetical accident conditions. However, the Z-flanges are positioned behind the locking Z-flange and outer thermal shield. Failure of the Z-flanges could reduce the effectiveness of the closure region thermal design and thus the containment seals, resulting in a release radioactive material from the packaging, but only in conjunction with failure of the locking Z-flange and outer thermal shield.



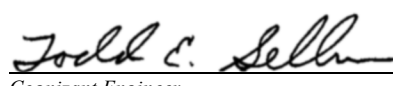

Critical Characteristics: ☒ CMTR (chemicals and physicals) ☒ Other (state below):

Stainless steel material per ASTM A240, Type 304. The thickness for the upper and lower Z-flanges is 14-gauge (0.075-inch), with sheet thickness tolerances in accordance with Table A1.2 of ASTM A480-95a or A2.13 of ASTM A480-99b.

If Z-flanges are fabricated as welded assemblies, all construction welding shall be full penetration butt welds, and weld procedures and welding personnel shall be qualified in accordance with Section IX of the ASME Boiler and Pressure Vessel Code (1995 Edition, 1997 Addenda, or later). Visually examine butt welds in accordance with AWS D1.1 and liquid penetrant inspect in accordance with Section III, Division 1, Subsection NF, Article NF-5000, of the ASME Boiler and Pressure Vessel Code (1995 Edition, 1997 Addenda, or later).

COMMERCIAL GRADE DEDICATION: (SUMMARIZE CHARACTERISTICS)

N/A

 11.19.04
Preparer Date
 11.23.04
Cognizant Manager Date
 11/23/04
Cognizant Engineer Date
 12-7-04
QA Representative Date

System No. PT01 Document No. PE-04-0002 Rev. 0
Subject HalfPACT Package QCA No. 07 Rev. 0
Drawing No. PacTec Drawing No. 707-SAR (HalfPACT Safety Analysis Report Drawing) Rev. 6

ITEM DESCRIPTION:

OCA LOCKING Z-FLANGE

Sheet 1, G/N 6, Zone C/D-6/7/8; Sheet 1, G/N 7, Zone C-6/7/8; Sheet 1, G/N 8, Zone C-6/7/8; Sheet 1, F/N 28, Zone C-4/5/6; Sheet 4, Detail B, Zone C-3/4

QUALITY CATEGORY: ☒ Category A ☐ Category B ☐ Category C

Basis:

The OCA locking Z-flange comprises a portion of the packaging's lid closure hardware, and is required to maintain positive closure and containment under normal conditions of transport and hypothetical accident conditions. Failure of the locking Z-flange could result in separation of the lid and body resulting in a release of radioactive material from the packaging.

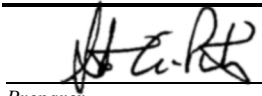
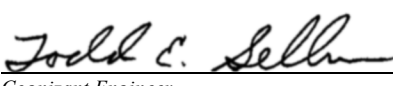
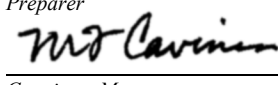

Critical Characteristics: ☒ CMTR (chemicals and physicals) ☒ Other (state below):

Stainless steel material per ASTM A240, Type 304. The thickness for the locking Z-flange is 14-gauge (0.075-inch), with sheet thickness tolerances in accordance with Table A1.2 of ASTM A480-95a or A2.13 of ASTM A480-99b.

If Z-flanges are fabricated as welded assemblies, all construction welding shall be full penetration butt welds, and weld procedures and welding personnel shall be qualified in accordance with Section IX of the ASME Boiler and Pressure Vessel Code (1995 Edition, 1997 Addenda, or later). Visually examine butt welds in accordance with AWS D1.1 and liquid penetrant inspect in accordance with Section III, Division 1, Subsection NF, Article NF-5000, of the ASME Boiler and Pressure Vessel Code (1995 Edition, 1997 Addenda, or later).

COMMERCIAL GRADE DEDICATION: (SUMMARIZE CHARACTERISTICS)

N/A

 Preparer	<u>11.19.04</u> Date	 Cognizant Engineer	<u>11/23/04</u> Date
 Cognizant Manager	<u>11.23.04</u> Date	 QA Representative	<u>12-7-04</u> Date

System No. PT01 Document No. PE-04-0002 Rev. 0
Subject HalfPACT Package QCA No. 08 Rev. 0
Drawing No. PacTec Drawing No. 707-SAR (HalfPACT Safety Analysis Report Drawing) Rev. 6

ITEM DESCRIPTION:

ICV UPPER AND LOWER SPACER BRACKETS

Sheet 3, Detail P, Zone B/C-4/5; Sheet 3, Detail S, Zone B-2

QUALITY CATEGORY: ☐ Category A ☐ Category B ☒ Category C

Basis:




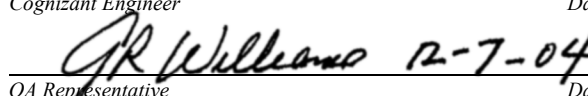
The brackets secure the upper and lower spacer assemblies to the ICV, and are welded to the containment boundary. Furthermore, these items are optional and have no safety significance. Failure of the brackets would not release radioactive material from the packaging, resulting in no condition adversely affecting public health and safety.

Critical Characteristics: ☐ CMTR (chemicals and physicals) ☒ Other (state below):

Stainless steel material per ASTM A240, Type 304. The thickness for the brackets is 11-gauge (0.120-inch) or 12-gauge (0.105-inch), with sheet thickness tolerances in accordance with Table A1.2 of ASTM A480-95a or A2.13 of ASTM A480-99b.

COMMERCIAL GRADE DEDICATION: (SUMMARIZE CHARACTERISTICS)

N/A

 Preparer	<u>11.19.04</u> Date	 Cognizant Engineer	<u>11/23/04</u> Date
 Cognizant Manager	<u>11.23.04</u> Date	 QA Representative	<u>12-7-04</u> Date

System No. PT01 Document No. PE-04-0002 Rev. 0
Subject HalfPACT Package QCA No. 09 Rev. 0
Drawing No. PacTec Drawing No. 707-SAR (HalfPACT Safety Analysis Report Drawing) Rev. 6

ITEM DESCRIPTION:

ICV UPPER AND LOWER SPACERS

1. **Upper and Lower Spacer Facing Sheet:** Sheet 3, Detail "ICV ASSEMBLY", Zone A/B-6/7/8; Sheet 3, Detail "ALUMINUM HONEYCOMB SPACER DETAIL", Zone C/D-3/4/5
2. **Upper and Lower Spacer Honeycomb:** Sheet 3, Detail "ICV ASSEMBLY", Zone A/B-6/7/8; Sheet 3, Detail "ALUMINUM HONEYCOMB SPACER DETAIL", Zone C/D-3/4/5

QUALITY CATEGORY: ☐ Category A ☒ Category B ☐ Category C

Basis:




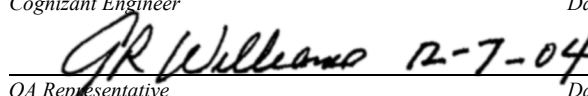
The ICV upper and lower spacers are internal dunnage that reduces impact loading against the containment vessel under normal conditions of transport and hypothetical accident conditions. Failure of the upper and lower spacer components would not directly result in a release of radioactive material from the packaging.

Critical Characteristics: ☒ CMTR (chemicals and physicals) ☒ Other (state below):

1. **Upper and Lower Spacer Facing Sheet:** The sheet material is 0.080-inch thick aluminum per ASTM B209, Type 6061-T6. The sheet may be constructed using two pieces joined with a full penetration weld at the center.
2. **Upper and Lower Spacer Honeycomb:** The aluminum honeycomb material is Hexcel ACG-3/8-003-3.6P or equivalent, with a minimum and maximum bare compressive/crush strength of 102 psi and 391 psi, respectively.

COMMERCIAL GRADE DEDICATION: (SUMMARIZE CHARACTERISTICS)

N/A

 Preparer	<u>11.19.04</u> Date	 Cognizant Engineer	<u>11/23/04</u> Date
 Cognizant Manager	<u>11.23.04</u> Date	 QA Representative	<u>12-7-04</u> Date

System No. PT01 Document No. PE-04-0002 Rev. 0
Subject HalfPACT Package QCA No. 10 Rev. 0
Drawing No. PacTec Drawing No. 707-SAR (HalfPACT Safety Analysis Report Drawing) Rev. 6

ITEM DESCRIPTION:

LID/BODY INNER (CONTAINMENT) O-RING SEALS

1. **ICV:** Sheet 1, G/N 18, Zone B-7/8; Sheet 5, Section W-W, Zone B-7
2. **OCV:** Sheet 1, G/N 18, Zone B-7/8; Sheet 5, Section G-G, Zone D-5

VENT PORT PLUG (CONTAINMENT) O-RING SEALS

1. **ICV:** Sheet 1, G/N 18, Zone B-7/8; Sheet 12, Detail "ICV OUTER VENT PORT PLUG", Zone B/C-5
2. **OCV:** Sheet 1, G/N 18, Zone B-7/8; Sheet 11, Detail "OCV VENT PORT PLUG", Zone C/D-7/8

QUALITY CATEGORY: ☒ Category A ☐ Category B ☐ Category C

Basis:

Each lid/body inner (upper) O-ring seal and each vent port plug O-ring seal is required to maintain containment under normal conditions of transport and hypothetical accident conditions. Failure of a containment O-ring seal could release radioactive material from the packaging, directly resulting in a condition adversely affecting public health and safety.

Critical Characteristics: ☒ CMTR (chemicals and physicals) ☒ Other (state below):

If a Quality Level A vendor cannot be qualified, perform commercial grade dedication.

COMMERCIAL GRADE DEDICATION: (SUMMARIZE CHARACTERISTICS)




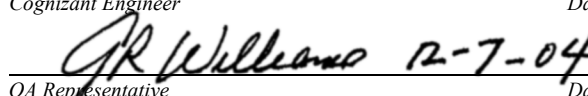
Physical Characteristics:

Butyl rubber material per RR-0405-70, Rainier Rubber Company, Seattle, Washington, or equivalent meeting the requirements of ASTM D2000 M4AA710 A13 B13 F17 F48 Z trace elements. Dimensions for each O-ring seal shall be as follows:

1. **ICV Lid/Body Inner:** 71½-inch (±2%) I.D. × Ø0.400-inch ±0.010-inch
2. **OCV Lid/Body Inner:** 75⅝-inch (±2%) I.D. × Ø0.400-inch ±0.010-inch
3. **ICV Outer Vent Port Plug:** Size per Parker AS-568-910 (3-910); 0.755-inch (±0.009-inch) I.D. × Ø0.097-inch ±0.003-inch
4. **OCV Vent Port Plug:** Size per Parker AS-568-906 (3-906); 0.468-inch (±0.005-inch) I.D. × Ø0.078-inch ±0.003-inch

Performance Characteristics:

1. O-ring seal joints shall not fail when bent to a radius of 1/2-inch.
2. Demonstrate an acceptable batch of seal material by passing all helium leak tests and the vacuum test specified in *Verification Methods*, below.

 Preparer	<u>11.19.04</u> Date	 Cognizant Engineer	<u>11/23/04</u> Date
 Cognizant Manager	<u>11.23.04</u> Date	 QA Representative	<u>12-7-04</u> Date

System No. PT01Document No. PE-04-0002 Rev. 0

Verification Methods:

1. Demonstrate acceptable O-ring seal joints by bending each joined region around a Ø1.0 bar. Acceptable O-ring seal joints will not separate during bend testing.
2. Qualify each batch of seal material as follows:
 - a. Utilize a test fixture that is capable of testing two, Ø0.393-inch ± 0.003 -inch O-ring seals; the diameter of the test fixture need not be full scale (the test fixture in Nuclear Packaging Sketch SK-835, *TRUPACT-II O-ring Test Fixture Assembly*, or one of similar configuration should be used; the SK-835 test fixture is configured to allow the plug to radially shift relative to the bore and provide a minimum O-ring seal compression of 15% when the plug is fully translated, i.e., metal-to-metal contact on one side).
 - b. Assemble the test fixture at room temperature with the two, lubricated test O-ring seals.
 - c. Perform a series of helium leak tests to demonstrate leaktightness under all conditions (i.e., 1×10^{-7} standard cubic centimeters per second (scc/s), or less, air reference leakage).
 - i. Center the plug inside the bore; while at room temperature, perform a helium leak test.
 - ii. Center the plug inside the bore; cool the test fixture to -40 °F; perform a helium leak test.
 - iii. Warm the test fixture to -20 °F; radially shift the plug relative to the bore to provide metal-to-metal contact on one side and minimum seal compression on the diametrically opposite side; perform a helium leak test.
 - iv. Maintain full radial offset; warm the test fixture to 300 °F; hold at temperature for eight hours minimum.
 - v. Verify that a rapid, hard vacuum (i.e., <1 torr, absolute) can be achieved and maintained for five (5) minutes between the two test O-ring seals.
 - vi. Maintain full radial offset; cool the test fixture to -20 °F; perform a helium leak test.

System No. PT01 Document No. PE-04-0002 Rev. 0
Subject HalfPACT Package QCA No. 11 Rev. 0
Drawing No. PacTec Drawing No. 707-SAR (HalfPACT Safety Analysis Report Drawing) Rev. 6

ITEM DESCRIPTION:

LID/BODY OUTER (TEST) O-RING SEALS

1. **ICV:** Sheet 1, G/N 44, Zone A-4/5/6; Sheet 5, Section W-W, Zone B-7
2. **OCV:** Sheet 1, G/N 44, Zone A-4/5/6; Sheet 5, Section G-G, Zone D-5

QUALITY CATEGORY: ☐ Category A ☐ Category B ☒ Category C

Basis:

Each lid/body outer (lower) O-ring seal is only required to perform leak testing of the containment O-ring seal. Failure of a test O-ring seal would not release radioactive material from the packaging, resulting in no condition adversely affecting public health and safety.

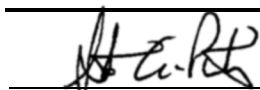
Critical Characteristics: ☐ CMTR (chemicals and physicals) ☒ Other (state below):

Neoprene or ethylene propylene rubber material per ASTM D2000 (70, 80, or 90 Durometer). Supply components with documentation containing dimensional and rubber compound certification.

1. **ICV Lid/Body Inner:** 71 $\frac{3}{16}$ -inch ($\pm 2\%$) I.D. \times Ø0.375-inch ± 0.010 -inch
2. **OCV Lid/Body Inner:** 74 $\frac{1}{4}$ -inch ($\pm 2\%$) I.D. \times Ø0.375-inch ± 0.010 -inch

COMMERCIAL GRADE DEDICATION: (SUMMARIZE CHARACTERISTICS)

N/A



Preparer

11.19.04

Date



Cognizant Engineer

11/23/04

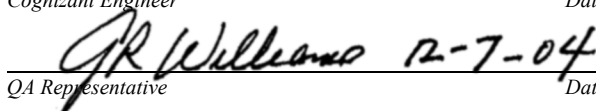
Date



Cognizant Manager

11.23.04

Date



QA Representative

12-7-04

Date

System No. PT01 Document No. PE-04-0002 Rev. 0
Subject HalfPACT Package QCA No. 12 Rev. 0
Drawing No. PacTec Drawing No. 707-SAR (HalfPACT Safety Analysis Report Drawing) Rev. 6

ITEM DESCRIPTION:

OCA/OCV EXTERNAL SEAL TEST PORT AND VENT PORT ACCESS COMPONENTS

- Seal Test Port Access Plug:** Sheet 5, Section G-G, Zone C/D-4; Sheet 11, Detail "OCV VENT PORT ACCESS PLUG", Zone B-4
- Seal Test Port Doubler Plate:** Sheet 1, F/N 19, Zone A/B-6/7/8; Sheet 5, Section G-G, Zone C/D-4; Sheet 5, View AF-AF, Zone B-3
- Seal Test Port Coupling:** Sheet 5, Section G-G, Zone C/D-4/5; Sheet 12, Detail "OCV SEAL TEST PORT COUPLING", Zone A/B-6
- Vent Port Access Plug:** Sheet 5, Section H-H, Zone C-2; Sheet 11, Detail "OCV VENT PORT ACCESS PLUG", Zone B-4
- Vent Port Doubler Plate:** Sheet 1, F/N 19, Zone A/B-6/7/8; Sheet 5, Section H-H, Zone C/D-2; Sheet 5, View AJ-AJ, Zone A/B-1/2
- Vent Port Coupling (Outboard):** Sheet 5, Section H-H, Zone C-2; Sheet 12, Detail "OCV VENT PORT COUPLING (OUTBOARD)", Zone B-2




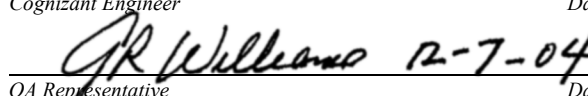
QUALITY CATEGORY: ☐ Category A ☒ Category B ☐ Category C

Basis:

Each OCA external seal test port and vent port access component provides reinforcement for the OCA outer shell to protect the underlying OCV O-ring seals from hypothetical accident conditions. Failure of these components could cause the containment seals to fail and release radioactive material from the packaging, but only in conjunction with failure of the OCA outer shell and/or adjoining components, indirectly resulting in a condition adversely affecting public health and safety.

Critical Characteristics: ☐ CMTR (chemicals and physicals) ☒ Other (state below):

- Seal Test Port Access Plug:** 1½-inch NPT flush pipe plug; stainless steel material. Supply component with a Certificate of Conformance containing configuration and material certification.
- Seal Test Port Doubler Plate:** 3/8-inch thick plate; stainless steel material per ASTM A240, Type 304. The minimum thickness for 3/8-inch nominal thickness material is 0.365-inch. The maximum thickness for 3/8-inch nominal material is in accordance with Table A1.17 of ASTM A480-95a or A2.17 of ASTM A480-99b. Supply material with a Certified Material Test Report (CMTR) containing chemical and physical properties.
- Seal Test Port Coupling:** Stainless steel material per ASTM A276 or A479, Type 304. Supply material with a Certified Material Test Report (CMTR) containing chemical and physical properties.
- Vent Port Access Plug:** 1½-inch NPT flush pipe plug; stainless steel material. Supply component with a Certificate of Conformance containing configuration and material certification.
- Vent Port Doubler Plate:** 3/8-inch thick plate; stainless steel material per ASTM A240, Type 304. The minimum thickness for 3/8-inch nominal thickness material is 0.365-inch. The maximum thickness for 3/8-inch nominal material is in accordance with Table A1.17 of ASTM A480-95a or A2.17 of ASTM A480-99b. Supply material with a Certified Material Test Report (CMTR) containing chemical and physical properties.

 Preparer	<u>11.19.04</u> Date	 Cognizant Engineer	<u>11/23/04</u> Date
 Cognizant Manager	<u>11.23.04</u> Date	 QA Representative	<u>12-7-04</u> Date

System No. PT01Document No. PE-04-0002 Rev. 0

- 6. Vent Port Coupling (Outboard):** Stainless steel material per ASTM A276 or A479, Type 304. Supply material with a Certified Material Test Report (CMTR) containing chemical and physical properties.

COMMERCIAL GRADE DEDICATION: (SUMMARIZE CHARACTERISTICS)

N/A

System No. PT01 Document No. PE-04-0002 Rev. 0
Subject HalfPACT Package QCA No. 13 Rev. 0
Drawing No. PacTec Drawing No. 707-SAR (HalfPACT Safety Analysis Report Drawing) Rev. 6

ITEM DESCRIPTION:

ICV COVERS AND DEBRIS EXCLUSION COMPONENTS

1. **Inner Vent Port Plug:** Sheet 5, Section V-V, Zone C-7; Sheet 12, Detail "ICV INNER VENT PORT PLUG", Zone B-6/7/8
2. **Inner Vent Port Plug O-ring Seal:** Sheet 1, G/N 18, Zone B-7/8; Sheet 1, G/N 44, Zone A-4/5/6; Sheet 12, Detail "ICV INNER VENT PORT PLUG", Zone B-7/8
3. **Vent Port Cover:** Sheet 5, Section V-V, Zone C-7; Sheet 12, Detail "ICV VENT PORT COVER", Zone C/D-3/4/5
4. **Vent Port Cover O-ring Gasket or Seal:** Sheet 1, G/N 18, Zone B-7/8; Sheet 1, G/N 44, Zone A-4/5/6; Sheet 12, Detail "ICV VENT PORT COVER", Zone C/D-5
5. **Wiper O-ring Seal:** Sheet 1, G/N 18, Zone B-7/8; Sheet 1, G/N 43, Zone A-4/5/6; Sheet 5, Section V-V, Zone D-7
6. **Wiper O-ring Seal Holder:** Sheet 5, Section V-V, Zone D-7
7. **Pan/Round Head Drive Screws:** Sheet 5, Section V-V, Zone D-7
8. **Debris Shield:** Sheet 5, Section W-W, Zone B-7
9. **Debris Shield Adhesive Tape:** Sheet 5, Section W-W, Zone B-7
10. **Optional Vent Port Mesh:** Sheet 5, Section V-V, Zone D-7

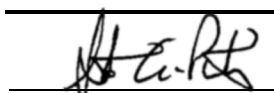

QUALITY CATEGORY: ☐ Category A ☐ Category B ☒ Category C



Basis:

The ICV covers and debris exclusion components keep underlying ICV ports and components clean. Failure of these components would not release radioactive material from the packaging, resulting in no condition adversely affecting public health and safety.

Critical Characteristics: ☐ CMTR (chemicals and physicals) ☒ Other (state below):

1. **Inner Vent Port Plug:** Brass material per ASTM B16, Alloy 360, 1/2 hard temper. Supply material with documentation containing material compliance.
2. **Inner Vent Port Plug O-ring Seal:** Size per Parker AS-568-906 (3-906); 0.468-inch (± 0.005 -inch) I.D. \times $\varnothing 0.078$ -inch ± 0.003 -inch; butyl rubber material per RR-0405-70, Rainier Rubber Company, Seattle, Washington, or neoprene or ethylene propylene rubber material per ASTM D2000 (70, 80, or 90 Durometer). Supply component with documentation containing dimensional and material compliance.
3. **Vent Port Cover:** Brass material per ASTM B16, Alloy 360, 1/2 hard temper. Supply with documentation containing material compliance.
4. **Vent Port Cover Gasket or O-ring Seal:** 1/16-inch thick gasket, or size per Parker AS-568-916 (3-916) O-ring seal; 1.171-inch (± 0.010 -inch) I.D. \times $\varnothing 0.116$ -inch ± 0.004 -inch; butyl rubber material per RR-0405-70, Rainier Rubber Company, or neoprene or ethylene propylene per ASTM D2000 (70, 80, or 90 Durometer). Supply component with documentation containing dimensional and material compliance.


Preparer

Cognizant Manager
11.19.04
Date
11.23.04
Date


Cognizant Engineer
11/23/04
Date

QA Representative
12-7-04
Date

System No. PT01 Document No. PE-04-0002 Rev. 0

5. **Wiper O-ring Seal:** Ø68-inch (±2%) I.D. × Ø0.375-inch ±0.010-inch; butyl rubber material per RR-0403-50 (Rainier Rubber Company, Seattle, Washington), buna-N rubber material per MIL-R-3065, Grade 50, fluorocarbon rubber material per ASTM D2000, MHK 607, Z1 (50 or 55 Shore A hardness), or fluorosilicone rubber material per MIL-R-25988. Supply component with documentation containing dimensional and rubber compound compliance.
6. **Wiper O-ring Seal Holder:** Stainless steel material per ASTM A240, Type 304. The thickness of the wiper O-ring seal holder is 16-gauge (0.060-inch thick), with sheet thickness tolerances in accordance with Table A1.2 of ASTM A480-95a or A2.13 of ASTM A480-99b. Supply component with documentation containing dimensional and material compliance.
7. **Pan/Round Head Drive Screws:** #6 - #8 × 3/8-inch long, Type U, pan or round head drive screw; stainless steel material. Supply components with documentation containing dimensional and material compliance.
8. **Debris Shield:** 1/8-inch minimum thickness × 1/2-inch wide; open cell silicone sponge rubber material. Supply component with documentation containing dimensional and material compliance.
9. **Debris Shield Adhesive Tape:** 1/2-inch wide double-sided adhesive tape, or equivalent. Supply component with documentation containing dimensional and material configuration.
10. **Optional Vent Port Mesh:** Type 304 stainless steel material. Supply component with documentation containing material compliance.

COMMERCIAL GRADE DEDICATION: (SUMMARIZE CHARACTERISTICS)

N/A

System No. PT01 Document No. PE-04-0002 Rev. 0
Subject HalfPACT Package QCA No. 14 Rev. 0
Drawing No. PacTec Drawing No. 707-SAR (HalfPACT Safety Analysis Report Drawing) Rev. 6

ITEM DESCRIPTION:

OCA/OCV COVERS AND DEBRIS EXCLUSION COMPONENTS

1. **Seal Test Port Fiberglass Tube:** Sheet 5, Section G-G, Zone C/D-4/5
2. **Seal Test Port Tubing:** Sheet 5, Section G-G, Zone C/D-4/5
3. **Vent Port Fiberglass Tube:** Sheet 5, Section H-H, Zone C-2/3
4. **Vent Port Plug Handling O-ring Seal:** Sheet 1, G/N 18, Zone B-7/8; Sheet 1, G/N 44, Zone A-4/5/6; Sheet 11, Detail "OCV VENT PORT PLUG", Zone C-7
5. **Vent Port Cover:** Sheet 5, Section H-H, Zone C-3; Sheet 11, Detail "OCV VENT PORT COVER", Zone B/C-6/7/8
6. **Vent Port Cover O-ring Seal:** Sheet 1, G/N 18, Zone B-7/8; Sheet 1, G/N 44, Zone A-4/5/6; Sheet 11, Detail "OCV VENT PORT COVER", Zone B/C-6/7/8
7. **Vent Port Cover Handling O-ring Seal:** Sheet 1, G/N 18, Zone B-7/8; Sheet 1, G/N 44, Zone A-4/5/6; Sheet 11, Detail "OCV VENT PORT COVER", Zone B/C-7

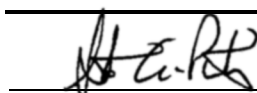

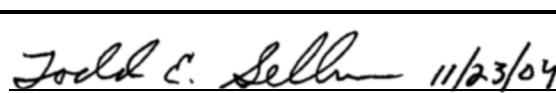

QUALITY CATEGORY: ☐ Category A ☐ Category B ☒ Category C

Basis:

The OCA/OCV covers and debris exclusion components keep underlying OCV ports and components clean. Failure of these components would not release radioactive material from the packaging, resulting in no condition adversely affecting public health and safety.

Critical Characteristics: ☐ CMTR (chemicals and physicals) ☒ Other (state below):

1. **Seal Test Port Fiberglass Tube:** Ø1⅝-inch, 0.06-inch wall thickness; fiberglass material. Supply component with documentation containing dimensional and material compliance.
2. **Seal Test Port Tubing:** Ø1½-inch, 20-gauge (0.030-inch wall thickness); stainless steel material per ASTM A213, Type 304. Supply with documentation containing dimensional and material compliance.
3. **Vent Port Fiberglass Tube:** Ø1⅝-inch, 0.06-inch wall thickness; fiberglass material. Supply component with documentation containing dimensional and material compliance.
4. **Vent Port Plug Handling O-ring Seal:** Size per Parker AS-568-011 (2-011); 0.299-inch (±0.005-inch) I.D. × Ø0.070-inch ±0.004-inch; butyl rubber material per RR-0405-70, Rainier Rubber Company, or neoprene or ethylene propylene rubber material per ASTM D2000 (70, 80, or 90 Durometer). Supply component with documentation containing dimensional and material compliance.
5. **Vent Port Cover:** Brass material per ASTM B16, Alloy 360, 1/2 hard temper. Supply with documentation containing material compliance.
6. **Vent Port Cover O-ring Seal:** Size per Parker AS-568-914 (3-914); 1.047-inch (±0.010-inch) I.D. × Ø0.116-inch ±0.004-inch; butyl rubber material per RR-0405-70, Rainier Rubber Company, or neoprene or ethylene propylene rubber material per ASTM D2000 (70, 80, or 90 Durometer). Supply component with documentation containing dimensional and material compliance.

 11.19.04
Preparer Date
 11.23.04
Cognizant Manager Date
 11/23/04
Cognizant Engineer Date
 12-7-04
QA Representative Date

System No. PT01Document No. PE-04-0002 Rev. 0

7. **Vent Port Cover Handling O-ring Seal:** Size per Parker AS-568-014 (2-014); 0.486-inch (± 0.006 -inch) I.D. \times $\varnothing 0.070$ -inch ± 0.004 -inch; butyl rubber material per RR-0405-70, Rainier Rubber Company, or neoprene or ethylene propylene rubber material per ASTM D2000 (70, 80, or 90 Durometer). Supply component with documentation containing dimensional and material compliance.

COMMERCIAL GRADE DEDICATION: (SUMMARIZE CHARACTERISTICS)

N/A

System No. PT01 Document No. PE-04-0002 Rev. 0
Subject HalfPACT Package QCA No. 15 Rev. 0
Drawing No. PacTec Drawing No. 707-SAR (HalfPACT Safety Analysis Report Drawing) Rev. 6

ITEM DESCRIPTION:

OCA INTERNAL TEMPERATURE CONTROL COMPONENTS

1. **Ceramic Tape:** Sheet 4, Detail Y, Zone B-7
2. **Adhesive:** Sheet 4, Detail Y, Zone B-7
3. **Inner Thermal Shield:** Sheet 4, Detail B, Zone C-4/5
4. **Pop Rivets:** Sheet 1, Flag Note 37, Zone B-4/5/6; Sheet 4, Detail B, Zone C-4/5
5. **Fiberglass Insulation:** Sheet 4, Detail B, Zone C-4/5
6. **Lid Angle:** Sheet 4, Detail Y, Zone B-7
7. **Body Angle:** Sheet 4, Detail Y, Zone A/B-7
8. **Seal Test Port Foam or Ceramic Plug:** Sheet 1, F/N 4, Zone D-6/7/8; Sheet 1, F/N 34, Zone B/C-4/5/6; Sheet 5, Section G-G, Zone C/D-4/5
9. **Vent Port Foam or Ceramic Plug:** Sheet 1, F/N 4, Zone D-6/7/8; Sheet 1, F/N 34, Zone B/C-4/5/6; Sheet 5, Section H-H, Zone C-2/3




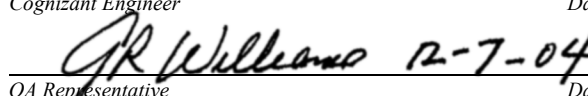
QUALITY CATEGORY: ☐ Category A ☒ Category B ☐ Category C

Basis:

The ceramic tape, inner thermal shield, fiberglass insulation, and angles are OCA closure interface internal temperature control components, secondary in nature to the outer thermal shield. Failure of these components could reduce the effectiveness of the closure region thermal design and thus the containment seals, resulting in a release radioactive material from the packaging, but only in conjunction with failure of the outer thermal shield, indirectly resulting in a condition adversely affecting public health and safety.

Critical Characteristics: ☐ CMTR (chemicals and physicals) ☒ Other (state below):

1. **Ceramic Tape:** 1-inch wide woven tape; ceramic fiber industrial textile material. Supply material with a Certificate of Conformance containing dimensional and material compliance.
2. **Adhesive:** Thermoseal or RTV silicone adhesive material. Supply material with a Certificate of Conformance containing material compliance.
3. **Inner Thermal Shield:** Stainless steel material per ASTM A240, Type 304. The thickness of the inner thermal shield is 16-gauge (0.060-inch thick), with sheet thickness tolerances in accordance with Table A1.2 of ASTM A480-95a or A2.13 of ASTM A480-99b. Supply material with a Certificate of Conformance containing dimensional and material compliance.
4. **Pop Rivets:** Ø1/8-inch commercial pop rivets; stainless steel material. Supply material with a Certificate of Conformance containing configuration and material compliance.
5. **Fiberglass Insulation:** 2-inch thick uncompressed; 0.6-lb/ft³ uncompressed fiberglass insulation material. Supply material with a Certificate of Conformance containing dimensional, configuration, and material compliance.

 Preparer	<u>11.19.04</u> Date	 Cognizant Engineer	<u>11/23/04</u> Date
 Cognizant Manager	<u>11.23.04</u> Date	 QA Representative	<u>12-7-04</u> Date

System No. PT01 Document No. PE-04-0002 Rev. 0

6. **Lid Angle:** 1-inch × 1-inch × 1/8-inch thick; stainless steel material per ASTM A276 or A479, Type 304. Supply material with a Certificate of Conformance containing configuration and material compliance.
7. **Body Angle:** 2-inch × 2-inch × 1/4-inch thick; stainless steel material per ASTM A276 or A479, Type 304. Supply material with a Certificate of Conformance containing configuration and material compliance.
8. **Seal Test Port Foam or Ceramic Plug:** Foam per *Commercial Grade Dedication*, below, or ceramic fiber paper material per Lytherm No. 1535-LK (nominal 1/4-inch thickness), Lydall Technical Papers, Rochester, New Hampshire, or Fiberfrax No. 970K, Unifrax Corporation, Niagara Falls, New York. Supply material with a Certificate of Conformance containing material compliance.
9. **Vent Port Foam or Ceramic Plug:** Foam per *Commercial Grade Dedication*, below, or ceramic fiber paper material per Lytherm No. 1535-LK (nominal 1/4-inch thickness), Lydall Technical Papers, Rochester, New Hampshire, or Fiberfrax No. 970K, Unifrax Corporation, Niagara Falls, New York. Supply material with a Certificate of Conformance containing material compliance.

COMMERCIAL GRADE DEDICATION: (SUMMARIZE CHARACTERISTICS)

Physical Characteristics:

See Section 8.1.4.1, *Polyurethane Foam*, of the HalfPACT Safety Analysis Report.

Performance Characteristics:

See Section 8.1.4.1, *Polyurethane Foam*, of the HalfPACT Safety Analysis Report.

Verification Methods:

See Section 8.1.4.1, *Polyurethane Foam*, of the HalfPACT Safety Analysis Report.

System No. PT01 Document No. PE-04-0002 Rev. 0
Subject HalfPACT Package QCA No. 16 Rev. 0
Drawing No. PacTec Drawing No. 707-SAR (HalfPACT Safety Analysis Report Drawing) Rev. 6

ITEM DESCRIPTION:

OCA EXTERNAL TEMPERATURE CONTROL COMPONENTS

OCA Outer Thermal Shield: Sheet 4, Detail B, Zone B/C-4

QUALITY CATEGORY: ☒ Category A ☐ Category B ☐ Category C

Basis:

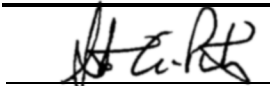



The OCA outer thermal shield is a temperature control component protecting components within the Z-flange region of the closure interface, and is required to thermally protect containment under normal conditions of transport and hypothetical accident conditions. Failure of the outer thermal shield could result in subsequent failure of the containment seals and release radioactive material from the packaging, directly resulting in a condition adversely affecting public health and safety.

Critical Characteristics: ☒ CMTR (chemicals and physicals) ☒ Other (state below):

OCA Outer Thermal Shield: Stainless steel material per ASTM A240, Type 304. The thickness for the outer thermal shield is 0.075-inch (14-gauge), with sheet thickness tolerances in accordance with Table A1.2 of ASTM A480-95a or A2.13 of ASTM A480-99b.

COMMERCIAL GRADE DEDICATION: (SUMMARIZE CHARACTERISTICS)

N/A

 Preparer	<u>11.19.04</u> Date	 Cognizant Engineer	<u>11/23/04</u> Date
 Cognizant Manager	<u>11.23.04</u> Date	 QA Representative	<u>12-7-04</u> Date

System No. PT01 Document No. PE-04-0002 Rev. 0
Subject HalfPACT Package QCA No. 17 Rev. 0
Drawing No. PacTec Drawing No. 707-SAR (HalfPACT Safety Analysis Report Drawing) Rev. 6

ITEM DESCRIPTION:

OCA FIRE CONSUMABLE VENT COMPONENTS

1. **Weld Flange:** Sheet 2, Detail "HalfPACT PACKAGING", Zone C/D-7; Sheet 2, View A-A, Zone C-2; Sheet 8, Section L-L, Zone D-7; Sheet 8, Section N-N, Zone D-2
2. **Pipe Plug:** Sheet 2, Detail "HalfPACT PACKAGING", Zone C/D-7; Sheet 2, View A-A, Zone C-2; Sheet 8, Section L-L, Zone D-7; Sheet 8, Section N-N, Zone D-2

OCA FOAM FILL PORT COMPONENTS

1. **Doubler Plate:** Sheet 8, Section K-K, Zone D-7; Sheet 8, Section L-L, Zone D-7; Sheet 8, Section "TYP FOAM FILL PORT IN OCA LOWER HEAD", Zone C-3/4
2. **Cover Plate:** Sheet 8, Section K-K, Zone D-7; Sheet 8, Section L-L, Zone D-7; Sheet 8, Section "TYP FOAM FILL PORT IN OCA LOWER HEAD", Zone C-3/4

QUALITY CATEGORY: ☐ Category A ☒ Category B ☐ Category C

Basis:

The OCA fire consumable vent components are used for venting gases produced during the hypothetical accident fire event, and the OCA foam fill port components provide temporary access to the OCA foam cavity for installation of the polyurethane foam. Failure of these components would not release radioactive material from the packaging but would reduce the effectiveness of the packaging, indirectly resulting in a condition adversely affecting public health and safety.

Critical Characteristics: ☐ CMTR (chemicals and physicals) ☒ Other (state below):

OCA FIRE CONSUMABLE VENT COMPONENTS




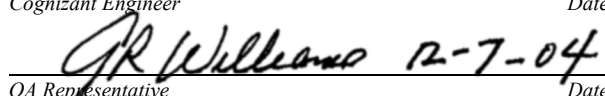
1. **Weld Flange:** 1½-inch NPT weld flange; stainless steel material. Supply component with a Certificate of Conformance containing configuration and material certification.
2. **Pipe Plug:** 1½-inch NPT flush pipe plug; plastic material. Supply component with a Certificate of Conformance containing configuration and material compliance

OCA FOAM FILL PORT COMPONENTS

1. **Doubler Plate:** 1/4-inch thick plate; stainless steel material per ASTM A240, Type 304. The minimum thickness for 1/4-inch nominal thickness material is 0.240-inch, and the maximum thickness is in accordance with Table A1.17 of ASTM A480-95a or A2.17 of ASTM A480-99b. Supply material with a Certified Material Test Report (CMTR) containing chemical and physical properties.
2. **Cover Plate:** 1/4-inch thick plate; stainless steel material per ASTM A240, Type 304. The minimum thickness for 1/4-inch nominal thickness material is 0.240-inch, and the maximum thickness is in accordance with Table A1.17 of ASTM A480-95a or A2.17 of ASTM A480-99b. Supply material with a Certified Material Test Report (CMTR) containing chemical and physical properties.

COMMERCIAL GRADE DEDICATION: (SUMMARIZE CHARACTERISTICS)

N/A

 11.19.04
Preparer Date
 11.23.04
Cognizant Manager Date
 11/23/04
Cognizant Engineer Date
 12-7-04
QA Representative Date

System No. PT01 Document No. PE-04-0002 Rev. 0
Subject HalfPACT Package QCA No. 18 Rev. 0
Drawing No. PacTec Drawing No. 707-SAR (HalfPACT Safety Analysis Report Drawing) Rev. 6

ITEM DESCRIPTION:

CERAMIC FIBER PAPER

Sheet 1, F/N 34, Zone B/C-4/5/6; Sheet 4, Detail B, Zone A/B/C/D-4/5; Sheet 4, Detail Z, Zone B-2/3; Sheet 8, Section M-M, Zone B-2

QUALITY CATEGORY: ☒ Category A ☐ Category B ☐ Category C

Basis:

The ceramic fiber paper material is a temperature control component that is required to protect the underlying polyurethane from being consumed in the hypothetical accident condition fire. Failure of the ceramic fiber paper material could cause a failure of the polyurethane foam and result in subsequent failure of the containment seals and release radioactive material from the packaging, directly resulting in a condition adversely affecting public health and safety.

Critical Characteristics: ☐ CMTR (chemicals and physicals) ☒ Other (state below):

Ceramic fiber paper material per Lytherm No. 1535-LK (nominal 1/4 inch thickness), Lydall Technical Papers, Rochester, New Hampshire, or Fiberfrax No. 970K, Unifrax Corporation, Niagara Falls, New York. The material shall be acceptable if continuous direct exposure to a 800 °C (1,475 °F) thermal environment for 30 minutes does not reduce the material's effectiveness as a thermal barrier, i.e., physically intact. If a Quality Level A vendor cannot be qualified, perform commercial grade dedication based on the critical characteristics.

COMMERCIAL GRADE DEDICATION: (SUMMARIZE CHARACTERISTICS)

Physical Characteristics:




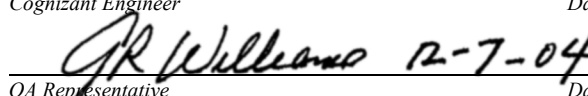
See *Critical Characteristics*, above.

Performance Characteristics:

See *Critical Characteristics*, above.

Verification Methods:

See *Critical Characteristics*, above.

 Preparer	<u>11.19.04</u> Date	 Cognizant Engineer	<u>11/23/04</u> Date
 Cognizant Manager	<u>11.23.04</u> Date	 QA Representative	<u>12-7-04</u> Date

System No. PT01 Document No. PE-04-0002 Rev. 0
Subject HalfPACT Package QCA No. 19 Rev. 0
Drawing No. PacTec Drawing No. 707-SAR (HalfPACT Safety Analysis Report Drawing) Rev. 6

ITEM DESCRIPTION:

POLYURETHANE FOAM

Sheet 1, F/N 4, Zone D-6/7/8; Sheet 2, "HalfPACT PACKAGING", Zone B/C/D-5/6/7

QUALITY CATEGORY: ☒ Category A ☐ Category B ☐ Category C

Basis:

The polyurethane foam is required to maintain containment by directly protecting the containment seals under normal conditions of transport and hypothetical accident conditions. Failure of the polyurethane foam could cause a failure of the containment seals and release radioactive material from the packaging, directly resulting in a condition adversely affecting public health and safety.

Critical Characteristics: ☐ CMTR (chemicals and physicals) ☒ Other (state below):

The rigid polyurethane foam material shall meet the chemical, physical, and performance requirements specified in Section 8.1.4.1, *Polyurethane Foam*, of the HalfPACT Safety Analysis Report. If a Quality Level A vendor cannot be qualified, perform commercial grade dedication based on the critical characteristics.

COMMERCIAL GRADE DEDICATION: (SUMMARIZE CHARACTERISTICS)

Physical Characteristics:

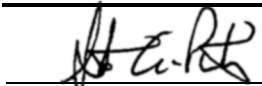
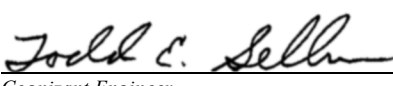


See Section 8.1.4.1, *Polyurethane Foam*, of the HalfPACT Safety Analysis Report.

Performance Characteristics:

See Section 8.1.4.1, *Polyurethane Foam*, of the HalfPACT Safety Analysis Report.

Verification Methods:

See Section 8.1.4.1, *Polyurethane Foam*, of the HalfPACT Safety Analysis Report.

 Preparer	<u>11.19.04</u> Date	 Cognizant Engineer	<u>11/23/04</u> Date
 Cognizant Manager	<u>11.23.04</u> Date	 QA Representative	<u>12-7-04</u> Date

System No. PT01 Document No. PE-04-0002 Rev. 0
Subject HalfPACT Package QCA No. 20 Rev. 0
Drawing No. PacTec Drawing No. 707-SAR (HalfPACT Safety Analysis Report Drawing) Rev. 6

ITEM DESCRIPTION:

ICV LID CLOSURE COMPONENTS

1. **Optional Internal Thread Insert:** Sheet 7, Section T-T, Zone D-7
2. **Lock Bolt Weldment:** Sheet 7, Section T-T, Zone D-7; Sheet 7, Detail "LOCK BOLT WELDMENT", Zone A-7
3. **Locking Ring Pins:** Sheet 7, Detail "ICV AND OCV LOCKING RING PIN", Zone A-5; Sheet 10, View BA-BA, Zone D-2

OCA LID CLOSURE COMPONENTS

1. **Round Bar:** Sheet 4, Detail Y, Zone B-7
2. **Internal Thread Insert:** Sheet 4, Detail Y, Zone B-7
3. **Lock Bolt Weldment:** Sheet 2, View A-A, Zone B-3; Sheet 4, Detail Y, Zone B-6/7; Sheet 7, Detail "LOCK BOLT WELDMENT", Zone A-7
4. **Locking Ring Pins:** Sheet 7, Detail "ICV AND OCV LOCKING RING PIN", Zone A-5; Sheet 10, View BC-BC, Zone B/C-2
5. **Pan Head Screws:** Sheet 4, Detail AC, Zone C-2

QUALITY CATEGORY: ☒ Category A ☐ Category B ☐ Category C

Basis:

The ICV and OCV lid closure components are required to maintain containment under normal conditions of transport and hypothetical accident conditions. Failure of the lid closure components could release radioactive material from the packaging, directly resulting in a condition adversely affecting public health and safety.

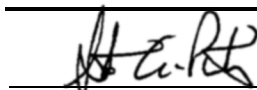

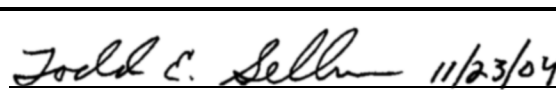
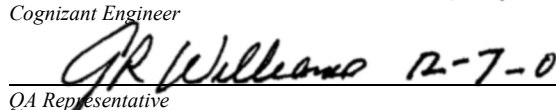
Critical Characteristics: ☐ CMTR (chemicals and physicals) ☒ Other (state below):

ICV LID CLOSURE COMPONENTS

1. **Optional Internal Thread Insert:** 1/2-13UNC; Tridair KN813J, Fairchild Fasteners, Torrance, California, or equivalent. Supply components with a Certificate of Conformance containing configuration and material certification.
2. **Lock Bolt Weldment:** Socket head cap screw, 1/2-13UNC, 1-inch long; stainless steel material, and, 3/4-inch O.D. \times 11-gauge (0.120-inch thick), seamless tubing; Type 304 stainless steel material. Supply components with a Certificate of Conformance containing configuration and material certification.
3. **Locking Ring Pins:** Stainless steel material per ASTM A564, Type 630, Condition 1150. Supply material with a Certified Material Test Report (CMTR) containing chemical and physical properties.

OCA LID CLOSURE COMPONENTS

1. **Round Bar:** Stainless steel material per ASTM A276 or A479, Type 304. Supply material with a Certified Material Test Report (CMTR) containing chemical and physical properties.
2. **Internal Thread Insert:** 1/2-13UNC; Tridair KN813J, Fairchild Fasteners, Torrance, California, or equivalent. Supply components with a Certificate of Conformance containing configuration and material certification.

 11.19.04
Preparer Date
 11.23.04
Cognizant Manager Date
 11/23/04
Cognizant Engineer Date
 12-7-04
QA Representative Date

System No. PT01Document No. PE-04-0002 Rev. 0

3. **Lock Bolt Weldment:** Socket head cap screw, 1/2-13UNC, 1-inch long; 18-8 stainless steel material, and, 3/4-inch O.D. × 11-gauge (0.120-inch thick), seamless tubing; Type 304 stainless steel material. Supply components with a Certificate of Conformance containing configuration and material certification.
4. **Locking Ring Pins:** Stainless steel material per ASTM A564, Type 630, Condition 1150. Supply material with a Certified Material Test Report (CMTR) containing chemical and physical properties.
5. **Pan Head Screws:** Pan head screw, 1/4-20UNC or 1/4-28UNF, 3/8-inch long; 18-8 stainless steel material. Supply components with a Certificate of Conformance containing configuration certification and material properties.

COMMERCIAL GRADE DEDICATION: (SUMMARIZE CHARACTERISTICS)

N/A

System No. PT01 Document No. PE-04-0002 Rev. 0
Subject HalfPACT Package QCA No. 21 Rev. 0
Drawing No. PacTec Drawing No. 707-SAR (HalfPACT Safety Analysis Report Drawing) Rev. 6

ITEM DESCRIPTION:

ICV VENT PORT COMPONENTS

1. **Vent Port Insert:** Sheet 5, Section V-V, Zone C-7; Sheet 12, Detail "ICV VENT PORT INSERT", Zone C/D-7
2. **Outer Vent Port Plug:** Sheet 5, Section V-V, Zone C-7; Sheet 12, Detail "ICV OUTER VENT PORT PLUG", Zone B/C-4/5

OCV VENT PORT COMPONENTS

1. **Vent Port Coupling (Inboard):** Sheet 5, Section H-H, Zone C-3; Sheet 12, Detail "OCV VENT PORT COUPLING (INBOARD)", Zone C/D-2
2. **Vent Port Fitting:** Sheet 5, Section H-H, Zone C-3; Sheet 11, Detail "OCV VENT PORT FITTING", Zone C/D-1/2/3
3. **Vent Port Plug:** Sheet 5, Section H-H, Zone C-3; Sheet 11, Detail "OCV VENT PORT PLUG", Zone C/D-7/8

QUALITY CATEGORY: ☒ Category A ☐ Category B ☐ Category C

Basis:

The ICV and OCV vent port components are required to maintain containment under normal conditions of transport and hypothetical accident conditions. Failure of the vent port components could release radioactive material from the packaging, directly resulting in a condition adversely affecting public health and safety.

Critical Characteristics: ☒ CMTR (chemicals and physicals) ☐ Other (state below):

ICV VENT PORT COMPONENTS




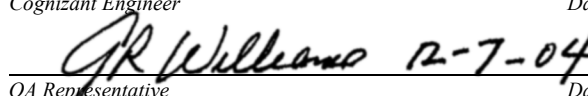
1. **Vent Port Insert:** Stainless steel material per ASTM A479, Type 304.
2. **Outer Vent Port Plug:** Brass material per ASTM B16, Alloy 360, 1/2 hard temper.

OCV VENT PORT COMPONENTS

1. **Vent Port Coupling (Inboard):** Stainless steel material per ASTM A479, Type 304.
2. **Vent Port Fitting:** Stainless steel material per ASTM A479, Type 304.
3. **Vent Port Plug:** Brass material per ASTM B16, Alloy 360, 1/2 hard temper.

COMMERCIAL GRADE DEDICATION: (SUMMARIZE CHARACTERISTICS)

N/A

 Preparer	<u>11.19.04</u> Date	 Cognizant Engineer	<u>11/23/04</u> Date
 Cognizant Manager	<u>11.23.04</u> Date	 QA Representative	<u>12-7-04</u> Date

System No. PT01 Document No. PE-04-0002 Rev. 0
Subject HalfPACT Package QCA No. 22 Rev. 0
Drawing No. PacTec Drawing No. 707-SAR (HalfPACT Safety Analysis Report Drawing) Rev. 6

ITEM DESCRIPTION:

ICV SEAL TEST PORT COMPONENTS

1. **Seal Test Port Insert:** Sheet 5, Section W-W, Zone A/B-7; Sheet 11, Detail "OCV & ICV SEAL TEST PORT INSERT", Zone C/D-4/5
2. **Seal Test Port Plug:** Sheet 5, Section W-W, Zone A/B-7; Sheet 11, Detail "OCV & ICV SEAL TEST PORT PLUG", Zone A/B-6/7
3. **Seal Test Port Plug O-ring Seal:** Sheet 1, G/N 18, Zone B-7/8; Sheet 1, G/N 44, Zone A-4/5/6; Sheet 11, Detail "OCV & ICV SEAL TEST PORT PLUG", Zone A/B-7

OCV SEAL TEST PORT COMPONENTS

1. **Seal Test Port Insert:** Sheet 5, Section G-G, Zone C/D-5; Sheet 11, Detail "OCV & ICV SEAL TEST PORT INSERT", Zone C/D-4/5
2. **Seal Test Port Plug:** Sheet 5, Section G-G, Zone C/D-5; Sheet 11, Detail "OCV & ICV SEAL TEST PORT PLUG", Zone A/B-6/7
3. **Seal Test Port Plug O-ring Seal:** Sheet 1, G/N 18, Zone B-7/8; Sheet 1, G/N 44, Zone A-4/5/6; Sheet 11, Detail "OCV & ICV SEAL TEST PORT PLUG", Zone A/B-7

QUALITY CATEGORY: ☐ Category A ☒ Category B ☐ Category C

Basis:

The ICV and OCV seal test port components are utilized to demonstrate leaktightness of the main O-ring containment seal for normal conditions of transport and hypothetical accident conditions. These components provide a secondary level of containment protection. Failure of the seal test port components could reduce the effectiveness of the packaging, indirectly resulting in a condition adversely affecting public health and safety.

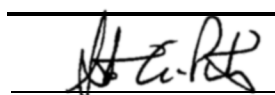

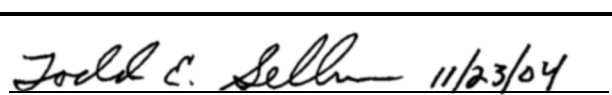
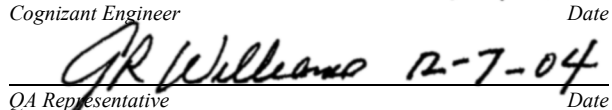
Critical Characteristics: ☐ CMTR (chemicals and physicals) ☒ Other (state below):

ICV SEAL TEST PORT COMPONENTS

1. **Seal Test Port Insert:** Stainless steel material per ASTM A479, Type 304. Supply components with a Certificate of Conformance containing material certification.
2. **Seal Test Port Plug:** Brass material per ASTM B16, Alloy 360, 1/2 hard temper. Supply components with a Certificate of Conformance containing material certification.
3. **Seal Test Port Plug O-ring Seal:** Size per Parker AS-568-905 (3-905); 0.414-inch (± 0.005 -inch) I.D. \times 0.072-inch ± 0.003 -inch; butyl rubber material per RR-0405-70, Rainier Rubber Company, Seattle, Washington, or neoprene or ethylene propylene rubber material per ASTM D2000 (70, 80, or 90 Durometer). Supply component with a Certificate of Conformance containing dimensional and material compliance.

OCV SEAL TEST PORT COMPONENTS

1. **Seal Test Port Insert:** Stainless steel material per ASTM A479, Type 304. Supply components with a Certificate of Conformance containing material certification.
2. **Seal Test Port Plug:** Brass material per ASTM B16, Alloy 360, 1/2 hard temper. Supply components with a Certificate of Conformance containing material certification.

 11.19.04
Preparer Date
 11.23.04
Cognizant Manager Date
 11/23/04
Cognizant Engineer Date
 12-7-04
QA Representative Date

System No. PT01Document No. PE-04-0002 Rev. 0

3. **Seal Test Port Plug O-ring Seal:** Size per Parker AS-568-905 (3-905); 0.414-inch (± 0.005 -inch) I.D. \times $\varnothing 0.072$ -inch ± 0.003 -inch; butyl rubber material per RR-0405-70, Rainier Rubber Company, Seattle, Washington, or neoprene or ethylene propylene rubber material per ASTM D2000 (70, 80, or 90 Durometer). Supply component with a Certificate of Conformance containing dimensional and material compliance.

COMMERCIAL GRADE DEDICATION: (SUMMARIZE CHARACTERISTICS)

N/A

System No. PT01 Document No. PE-04-0002 Rev. 0
Subject HalfPACT Package QCA No. 23 Rev. 0
Drawing No. PacTec Drawing No. 707-SAR (HalfPACT Safety Analysis Report Drawing) Rev. 6

ITEM DESCRIPTION:

ICV LID LIFTING COMPONENTS

1. **Pipe:** Sheet 8, Section X-X, Zone D-4/5
2. **Plate:** Sheet 8, Section X-X, Zone D-4/5
3. **Round Bar:** Sheet 8, Section AT-AT, Zone B/C-6
4. **Doubler Plate:** Sheet 8, Section X-X, Zone D-4/5

QUALITY CATEGORY: ☒ Category A ☐ Category B ☐ Category C

Basis:


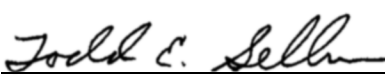

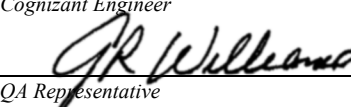
The ICV lid lift pocket components are a primary part of the inner vessel, and are required to maintain containment under normal conditions of transport and hypothetical accident conditions. Failure of the ICV lid lift pocket components could release radioactive material from the packaging, directly resulting in a condition adversely affecting public health and safety.

Critical Characteristics: ☒ CMTR (chemicals and physicals) ☒ Other (state below):

1. **Pipe:** Ø4-inch nominal, Schedule 80, pipe; stainless steel material per ASTM A312 or A376, Type 304. Supply material with a Certificate of Conformance containing dimensional compliance.
2. **Plate:** 1/4-inch thick plate; stainless steel material per ASTM A240, Type 304. The minimum thickness for 1/4-inch nominal thickness material is 0.240-inch, and the maximum thickness is in accordance with Table A1.17 of ASTM A480-95a or A2.17 of ASTM A480-99b.
3. **Round Bar:** Stainless steel material per ASTM A479, Type 304.
4. **Doubler Plate:** 3/8-inch thick plate; stainless steel material per ASTM A240 or A479, Type 304. The minimum thickness for 3/8-inch nominal thickness material is 0.365-inch, and the maximum thickness is in accordance with Table A1.17 of ASTM A480-95a or A2.17 of ASTM A480-99b.

COMMERCIAL GRADE DEDICATION: (SUMMARIZE CHARACTERISTICS)

N/A

 Preparer	<u>11.19.04</u> Date	 Cognizant Engineer	<u>11/23/04</u> Date
 Cognizant Manager	<u>11.23.04</u> Date	 QA Representative	<u>12-7-04</u> Date

System No. PT01 Document No. PE-04-0002 Rev. 0
Subject HalfPACT Package QCA No. 24 Rev. 0
Drawing No. PacTec Drawing No. 707-SAR (HalfPACT Safety Analysis Report Drawing) Rev. 6

ITEM DESCRIPTION:

OCA LID LIFTING COMPONENTS

1. **Lifting Straps:** Sheet 8, Section M-M, Zone B-2
2. **Doubler Plate:** Sheet 8, Section AX-AX, Zone B/C-7/8
3. **Round Bar:** Sheet 8, View AV-AV, Zone A/B-7/8

PACKAGING LIFTING COMPONENTS

1. **Fork Lift Pocket:** Sheet 4, Detail Z, Zone B-2/3

QUALITY CATEGORY: ☐ Category A ☒ Category B ☐ Category C

Basis:

The packaging and OCA lid lifting components are used for package handling. Failure of the package lifting or OCA lid lifting components could reduce the effectiveness of the packaging, indirectly resulting in a condition adversely affecting public health and safety.

Critical Characteristics: ☒ CMTR (chemicals and physicals) ☐ Other (state below):

OCA LID LIFTING COMPONENTS

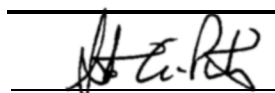

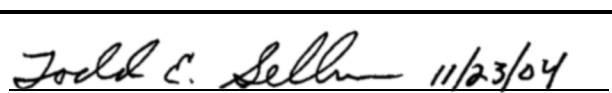
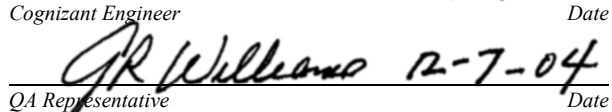
1. **Lifting Straps:** 1/4-inch thick; stainless steel material per ASTM A240, Type 304, or ASTM A276 or A479, Type 304. The minimum thickness for 1/4-inch nominal thickness, ASTM A240 material is 0.240-inch; the maximum thickness is in accordance with Table A1.17 of ASTM A480-95a or A2.17 of ASTM A480-99b.
2. **Doubler Plate:** 1/4-inch thick; stainless steel material per ASTM A240, Type 304. The minimum thickness for 1/4-inch nominal thickness material is 0.240-inch; the maximum thickness is in accordance with Table A1.17 of ASTM A480-95a or A2.17 of ASTM A480-99b.
3. **Round Bar:** Stainless steel material per ASTM A479, Type 304.

PACKAGING LIFTING COMPONENTS

1. **Fork Lift Pocket:** 3/16-inch thick; stainless steel material per ASTM A240, Type 304. The minimum thickness for 3/16-inch nominal thickness material is 0.178-inch; the maximum thickness is in accordance with Table A1.17 of ASTM A480-95a or A2.17 of ASTM A480-99b.

COMMERCIAL GRADE DEDICATION: (SUMMARIZE CHARACTERISTICS)

N/A

 11.19.04
Preparer Date
 11.23.04
Cognizant Manager Date
 11/23/04
Cognizant Engineer Date
 12-7-04
QA Representative Date

System No. PT01 Document No. PE-04-0002 Rev. 0
Subject HalfPACT Package QCA No. 25 Rev. 0
Drawing No. PacTec Drawing No. 707-SAR (HalfPACT Safety Analysis Report Drawing) Rev. 6

ITEM DESCRIPTION:

TIE-DOWN COMPONENTS

1. **Tie-down Lug:** Sheet 2, View A-A, Zone B/C-2; Sheet 9, View J-J, Zone A/B-4/5; Sheet 9, Detail "TIE-DOWN LUG", Zone B-1/2
2. **Side Doubler Plate:** Sheet 9, View J-J, Zone A/B-4/5
3. **Gusset:** Sheet 9, Section D-D, Options 1 & 2, Zone C/D-4/5/6/7; Sheet 9, View J-J, Zone A/B-4/5
4. **Bottom Doubler Plate:** Sheet 9, Section D-D, Options 1 & 2, Zone C/D-4/5/6/7
5. **Bottom Tripler Plate:** Sheet 9, Section BD-BD, Zone A-7/8; Sheet 9, Section BE-BE, Zone A-6

QUALITY CATEGORY: ☐ Category A ☒ Category B ☐ Category C

Basis:




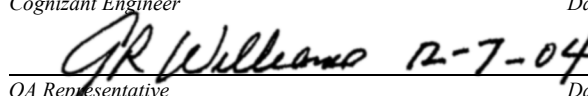
The packaging tie-down components secure the package to the transport vehicle. Failure of the tie-down components could reduce the effectiveness of the packaging and resulting in a release radioactive material from the packaging, but only in conjunction with failure of other packaging structural and thermal components, indirectly resulting in a condition adversely affecting public health and safety.

Critical Characteristics: ☒ CMTR (chemicals and physicals) ☒ Other (state below):

1. **Tie-down Lug:** Stainless steel material per ASTM A240 or A479, Type 304.
2. **Side Doubler Plate:** 3/8-inch thick plate; stainless steel material per ASTM A240 or A479, Type 304. The minimum thickness for 3/8-inch nominal thickness material is 0.365-inch, and the maximum thickness is in accordance with Table A1.17 of ASTM A480-95a or A2.17 of ASTM A480-99b.
3. **Gusset:** 1/4-inch thick plate; stainless steel material per ASTM A240, Type 304. The minimum thickness for 1/4-inch nominal thickness material is 0.240-inch, and the maximum thickness is in accordance with Table A1.17 of ASTM A480-95a or A2.17 of ASTM A480-99b.
4. **Bottom Doubler Plate:** 1/4-inch thick plate; stainless steel material per ASTM A240, Type 304. The minimum thickness for 1/4-inch nominal thickness material is 0.240-inch, and the maximum thickness is in accordance with Table A1.17 of ASTM A480-95a or A2.17 of ASTM A480-99b.
5. **Bottom Tripler Plate:** 1/2-inch or 1-inch thick plate; stainless steel material per ASTM A240, Type 304. Thickness tolerances are in accordance with Table A1.17 of ASTM A480-95a or A2.17 of ASTM A480-99b.

COMMERCIAL GRADE DEDICATION: (SUMMARIZE CHARACTERISTICS)

N/A

 Preparer	<u>11.19.04</u> Date	 Cognizant Engineer	<u>11/23/04</u> Date
 Cognizant Manager	<u>11.23.04</u> Date	 QA Representative	<u>12-7-04</u> Date

System No. PT01 Document No. PE-04-0002 Rev. 0
Subject HalfPACT Package QCA No. 26 Rev. 0
Drawing No. PacTec Drawing No. 707-SAR (HalfPACT Safety Analysis Report Drawing) Rev. 6

ITEM DESCRIPTION:

WELD FILLER MATERIAL

Various locations throughout most drawing sheets

QUALITY CATEGORY: ☒ Category A ☐ Category B ☐ Category C

Basis:

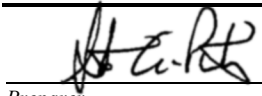
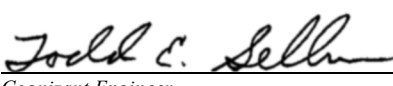
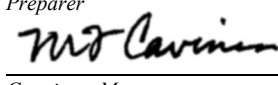

Weld filler material comprises portions of the containment structures, and is required to maintain containment under normal conditions of transport and hypothetical accident conditions. Failure of weld filler material could release radioactive material from the packaging. Since control of weld filler material between containment vessel and non-containment vessel components is difficult to implement at best, all weld filler material is Category A.

Critical Characteristics: ☒ CMTR (chemicals and physicals) ☒ Other (state below):

Compatible material with Type 304 stainless steel.

COMMERCIAL GRADE DEDICATION: (SUMMARIZE CHARACTERISTICS)

N/A

 Preparer	<u>11.19.04</u> Date	 Cognizant Engineer	<u>11/23/04</u> Date
 Cognizant Manager	<u>11.23.04</u> Date	 QA Representative	<u>12-7-04</u> Date

System No. PT01 Document No. PE-04-0002 Rev. 0
Subject HalfPACT Package QCA No. 27 Rev. 0
Drawing No. PacTec Drawing No. 707-SAR (HalfPACT Safety Analysis Report Drawing) Rev. 6

ITEM DESCRIPTION:

ICV MISCELLANEOUS COMPONENTS

1. **Pan/Round Head Screw:** Sheet 3, Detail P, Zone B/C-4/5; Sheet 3, Detail S, Zone B-2
2. **Flat Washer:** Sheet 3, Detail P, Zone B/C-4/5; Sheet 3, Detail S, Zone B-2
3. **U-Type Fastener:** Sheet 3, Detail P, Zone B/C-4/5; Sheet 3, Detail S, Zone B-2
4. **Locking Ring Stop Plate:** Sheet 10, Section AZ-AZ, Zone A-6

QUALITY CATEGORY: ☐ Category A ☐ Category B ☒ Category C

Basis:




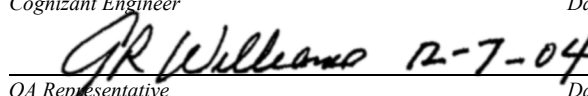
The ICV miscellaneous components are used for securing the upper and lower spacers into the ICV and limiting rotation of the ICV locking ring. Furthermore, these components are optional and have no significance to safety. Failure of these components would not release radioactive material from the packaging, resulting in no condition adversely affecting public health and safety.

Critical Characteristics: ☐ CMTR (chemicals and physicals) ☒ Other (state below):

1. **Pan/Round Head Screw:** Pan or round head screw, 1/4-20UNC, 3/4-inch long. Supply components with documentation containing configuration compliance.
2. **Flat Washer:** Flat washer, 5/16-inch nominal size. Supply components with documentation containing configuration compliance.
3. **U-Type Fastener:** U-type fastener for 1/4-20UNC threads, 1/8-inch nominal gap, and 7/8-inch throat. Supply components with documentation containing configuration compliance.
4. **Locking Ring Stop Plate:** Stainless steel material per ASTM A240, Type 304. The thickness of the locking ring stop plate is 12-gauge (0.105-inch thick), with sheet thickness tolerances in accordance with Table A1.2 of ASTM A480-95a or A2.13 of ASTM A480-99b. Supply material with documentation containing dimensional and material compliance.

COMMERCIAL GRADE DEDICATION: (SUMMARIZE CHARACTERISTICS)

N/A

 Preparer	<u>11.19.04</u> Date	 Cognizant Engineer	<u>11/23/04</u> Date
 Cognizant Manager	<u>11.23.04</u> Date	 QA Representative	<u>12-7-04</u> Date

System No. PT01 Document No. PE-04-0002 Rev. 0
Subject HalfPACT Package QCA No. 28 Rev. 0
Drawing No. PacTec Drawing No. 707-SAR (HalfPACT Safety Analysis Report Drawing) Rev. 6

ITEM DESCRIPTION:

OCA MISCELLANEOUS COMPONENTS

1. **Silicone Wear Pad:** Sheet 1, F/N 41, Zone B-3/4/5; Sheet 2, "HalfPACT PACKAGING", Zone B/C-6
2. **Nameplates:** Sheet 1, F/N 3, Zone D-6/7/8; Sheet 2, "HalfPACT PACKAGING", Zone D-2
3. **Label:** Sheet 1, F/N 46, Zone A-4/5/6; Sheet 2, "HalfPACT PACKAGING", Zone C-7/8
4. **Optional Shipping Label Holder:** Sheet 1, F/N 55, Zone C-2/3/4; Sheet 2, "HalfPACT PACKAGING", Zone C-7/8
5. **Optional Annulus Foam Ring:** Sheet 4, Detail B, Zone C-5
6. **Optional Guide Plate:** Sheet 4, Detail AC, Zone C-2
7. **Optional Pan/Round Head Screw:** Sheet 4, Detail AC, Zone C-2
8. **Optional Locking Ring Stop Plate:** Sheet 10, Section BB-BB, Zone A-5
9. **Optional Paint:** Sheet 1, F/N 25, Zone D-4/5/6


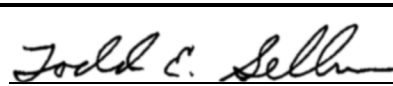

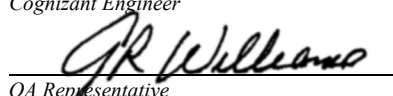
QUALITY CATEGORY: ☐ Category A ☐ Category B ☒ Category C

Basis:

The OCA miscellaneous components are used for reducing scuffing between the ICV and OCV, identifying the packaging, preventing debris from entering the annulus between the ICV and OCV, guiding the OCA lid onto the body, and limiting rotation of the OCV locking ring. Furthermore, the guide plate, pan head screws, and locking ring stop plates are optional and have no significance to safety. Failure of these components would not release radioactive material from the packaging, resulting in no condition adversely affecting public health and safety.

Critical Characteristics: ☐ CMTR (chemicals and physicals) ☒ Other (state below):

1. **Silicone Wear Pad:** 1/8-inch thick with optional pressure-sensitive adhesive backing on one side; silicone rubber material. Supply material with documentation containing dimensional and material compliance.
2. **Nameplates:** 1/2-inch high characters, minimum; stainless steel material. Supply material with documentation containing configuration and material compliance.
3. **Labels:** Any commercially available labels. Supply material with documentation containing configuration compliance.
4. **Optional Shipping Label Holder:** Stainless steel material. Supply material with documentation containing material compliance.
5. **Optional Annulus Foam Ring:** Esterfoam rubber material per MIL-P-26514-C200. Supply material with documentation containing material compliance.

 Preparer	<u>11.19.04</u> Date	 Cognizant Engineer	<u>11/23/04</u> Date
 Cognizant Manager	<u>11.23.04</u> Date	 QA Representative	<u>12-7-04</u> Date

System No. PT01 Document No. PE-04-0002 Rev. 0

6. **Optional Guide Plate:** 7-gauge (3/16-inch thick); stainless steel material per ASTM A240, Type 304. The minimum thickness for 3/16-inch nominal thickness material is 0.178-inch; the maximum thickness is in accordance with Table A1.2 of ASTM A480-95a or A2.13 of ASTM A480-99b for sheet material, or Table A1.17 of ASTM A480-95a or A2.17 of ASTM A480-99b for plate material.
7. **Optional Pan Head Screw:** Pan head screw, 10-24UNC or 10-32UNF, 1/2-inch long; stainless steel material. Supply material with documentation containing configuration and material compliance.
8. **Optional Locking Ring Stop Plate:** Stainless steel material per ASTM A240, Type 304. The thickness of the locking ring stop plate is 12-gauge (0.105-inch thick), with sheet thickness tolerances in accordance with Table A2.13 of ASTM A480. Supply material with documentation containing dimensional and material compliance.
9. **Optional Paint:** Any commercially available, low halogen paint. Supply material with documentation containing material compliance.

COMMERCIAL GRADE DEDICATION: (SUMMARIZE CHARACTERISTICS)

N/A

System No. PT01 Document No. PE-04-0002 Rev. 0
Subject HalfPACT Package QCA No. 29 Rev. 0
Drawing No. PacTec Drawing No. 707-SAR (HalfPACT Safety Analysis Report Drawing) Rev. 6

ITEM DESCRIPTION:

MISCELLANEOUS EXTERNAL COMPONENTS

1. **Tamper Indicating Seals:** Sheet 1, F/N 20, Zone A-6/7/8; Sheet 2, View A-A, Zone D-3; Sheet 4, Detail Y, Zone A/B-6/7; Sheet 5, View AH-AH, Zone B-4
2. **Tamper Indicating Tie-Wires:** Sheet 1, F/N 20, Zone A-6/7/8; Sheet 2, View A-A, Zone D-3; Sheet 4, Detail Y, Zone A/B-6/7; Sheet 5, View AH-AH, Zone B-4
3. **Hex Head Cap Screw:** Sheet 5, Section H-H, Zone C-2
4. **Round Tubing:** Sheet 8, Section M-M, Zone B/C-2
5. **Hex Head Cap Screws and Lock Washers:** Sheet 8, View AV-AV, Zone A-7/8
6. **Covers, Lanyards, and Spring Clips:** Sheet 8, Section M-M, Zone B/C-2
7. **Cover Plates:** Sheet 2, Detail E, Zone A/B-7/8
8. **Round Bars:** Sheet 4, Section AA-AA, Zone D-7
9. **Optional Internal Thread Inserts:** Sheet 4, Section AA-AA, Zone D-7
10. **Pan Head Screws and Flat Washers:** Sheet 4, Section AA-AA, Zone D-7

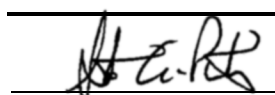
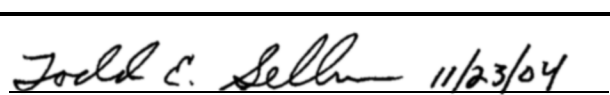

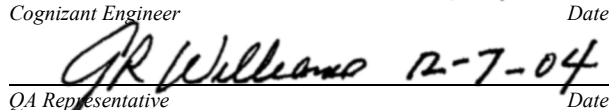
QUALITY CATEGORY: ☐ Category A ☐ Category B ☒ Category C

Basis:

These miscellaneous external components are each associated with a removable item that is installed prior to transport. Failure of these components would not release radioactive material from the packaging, resulting in no condition adversely affecting public health and safety.

Critical Characteristics: ☐ CMTR (chemicals and physicals) ☒ Other (state below):

1. **Tamper Indicating Seals:** Use any commercially available tamper-indicating sealing device that is compatible with the configuration. Supply component with documentation containing configuration compliance.
2. **Tamper Indicating Tie-Wires:** Use any commercially available stainless steel wire material that is compatible with the configuration. Supply component with documentation containing material compliance.
3. **Hex Head Cap Screw:** Hex head cap screw, 1/2-13UNC, 1/2-inch long; stainless steel material. Supply component with documentation containing configuration and material compliance.
4. **Round Tubing:** 4³/₄-inch O.D. × 4-inch I.D.; fiberglass material or equivalent. Supply material with documentation containing dimensional and material compliance.
5. **Hex Head Cap Screws and Lock Washers:** Hex head cap screw, 1/4-20UNC or 1/4-28UNF, 5/8-inch long; 1/4-inch star lock washer; stainless steel material. Supply components with documentation containing configuration and material compliance.
6. **Covers, Lanyards, and Spring Clips:** Supply components with documentation containing dimensional (if appropriate) and material compliance.
 - a. **Covers:** 5-inch I.D.; plastic, aluminum, or stainless steel material.

 Preparer	<u>11.19.04</u> Date	 Cognizant Engineer	<u>11/23/04</u> Date
 Cognizant Manager	<u>11.23.04</u> Date	 QA Representative	<u>12-7-04</u> Date

System No. PT01Document No. PE-04-0002 Rev. 0

- b. Lanyards:** Use any commercially available material.
 - c. Spring Clips:** Configured to fit onto a Ø7/8-inch bar; use any commercially available material.
- 7. Cover Plates:** 14-gauge (0.075-inch thick) or 16-gauge (0.060-inch thick); 300 series stainless steel material. Supply component with documentation containing dimensional and material compliance.
- 8. Round Bars:** Stainless steel material per ASTM A276 or A479, Type 304. Supply material with documentation containing material compliance.
- 9. Optional Internal Thread Inserts:** 1/4-20UNC; Tridair KN420J, Fairchild Fasteners, Torrance, California, or equivalent. Supply components with documentation containing configuration and material compliance.
- 10. Pan Head Screws and Flat Washers:** Pan head screw, 1/4-20UNC, 1/2-inch long; 1/4-inch flat washer; 18-8 stainless steel material. Supply components with documentation containing configuration and material compliance.

COMMERCIAL GRADE DEDICATION: (SUMMARIZE CHARACTERISTICS)

N/A

System No. PT01 Document No. PE-04-0002 Rev. 0
Subject HalfPACT Package QCA No. 30 Rev. 0
Drawing No. PacTec Drawing No. 707-SAR (HalfPACT Safety Analysis Report Drawing) Rev. 6

ITEM DESCRIPTION:

MISCELLANEOUS PACKAGING COMPONENTS

1. **Vacuum Grease:** Sheet 1, F/N 15, Zone B-6/7/8; Sheet 1, F/N 38, Zone B-4/5/6
2. **Optional Stainless Steel Compatible Lubricant:** Sheet 3, Detail P, Zone B-4/5; Sheet 4, Detail AC, Zone C-2
3. **Nickel Bearing Lubricant:** Sheet 1, F/N 16, Zone B-6/7/8
4. **Thread Locking Compound:** Sheet 1, F/N 17, Zone B-6/7/8
5. **Epoxy Adhesive:** Sheet 1, F/N 32, Zone C-4/5/6
6. **RTV Silicone Adhesive:** Sheet 1, F/N 33, Zone C-4/5/6; Sheet 1, F/N 34, Zone C-4/5/6
7. **Furane Adhesive:** Sheet 3, "ALUMINUM HONEYCOMB SPACER DETAIL", Zone D-3/4/5
8. **Optional Nickel Plating:** Sheet 1, F/N 53, Zone C-2/3/4
9. **Labeling:** Sheet 1, F/N 29, Zone C-3/4/5; Sheet 1, F/N 30, Zone C-3/4/5; Sheet 1, F/N 40, Zone B-3/4/5

QUALITY CATEGORY: ☐ Category A ☐ Category B ☒ Category C

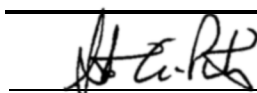

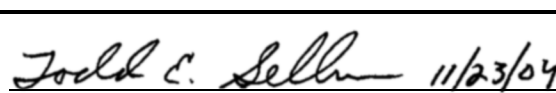

Basis:

The miscellaneous packaging components are used for component lubrication, adhesives, coatings, and packaging marking. Failure of these components would not release radioactive material from the packaging, resulting in no condition adversely affecting public health and safety.

Critical Characteristics: ☐ CMTR (chemicals and physicals) ☒ Other (state below):

MISCELLANEOUS PACKAGING COMPONENTS

1. **Vacuum Grease:** Any commercially available vacuum grease. Supply material with documentation containing material compliance.
2. **Optional Stainless Steel Compatible Lubricant:** Any commercially available stainless steel compatible lubricant. Supply material with documentation containing material compliance.
3. **Nickel Bearing Lubricant:** Any commercially available nickel bearing lubricant. Supply material with documentation containing material compliance.
4. **Thread-Locking Compound:** Any commercially available thread-locking compound. Supply material with documentation containing material compliance.
5. **Epoxy Adhesive:** Any commercially available epoxy adhesive. Supply material with documentation containing material compliance.
6. **RTV Silicone Adhesive:** Any commercially available silicone adhesive. Supply material with documentation containing material compliance.
7. **Furane Adhesive:** Adhesive per Furane Epocast[®] Product No. 1617-A/B (Ciba-Geigy Corporation, Furane Aerospace Products, Formulated Systems Group, Los Angeles, California), or equivalent. Supply material with documentation containing material compliance.


Preparer 11.19.04 Date

Cognizant Manager 11.23.04 Date

Cognizant Engineer 11/23/04 Date

QA Representative 12-7-04 Date

System No. PT01Document No. PE-04-0002 Rev. 0

8. **Optional Nickel Plating:** Any commercially available electroless nickel plating. Supply material with documentation containing material compliance.
9. **Labeling:** Any commercially available labeling process. Supply material with documentation containing material compliance.

COMMERCIAL GRADE DEDICATION: (SUMMARIZE CHARACTERISTICS)

N/A